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TRIGEMINAL NEURALGIA
With Especial Reference to its Treatment by Alcoholic Injection

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CHRONIC paroxysmal trigeminal neuralgia has an unique symptomatology, so that it has been possible to trace its occurrence back in medical literature over several centuries. Consideration of its etiology has raised several fascinating problems which are by no means confined to the rather narrow field of trigeminal neuralgia, but which can properly be considered in the wider field of paroxysmal neurological disorders.[1] Moreover, a study of the results of both surgical and alcoholic destruction of the sensory fibres of the trigeminal nerve, has resulted in an increase of our knowledge regarding this nerve, and has posed further questions as yet unsolved.

PATHOGENESIS

Very few studies have been made on autopsy material from cases with trigeminal neuralgia, but F. C. Grant[2] studied the Gasserian ganglia and their peripheral branches in two cases who died from other causes, and found no difference between the affected and non-affected sides. Wilfred Harris,[3] examined the Gasserian ganglia of another case, and also found no difference between the two sides.

Apart from the absence of any apparent changes in the nerves or brain stem, evidence of local disease in the face and neighbouring tissues is found in a high percentage of cases, and it is this occurrence that is responsible for the differentiation of the condition into two forms, primary or idiopathic and secondary. Most writers on the subject stress the frequency with which these focal disorders are found, and dental infection, diseased dental fillings, infected tonsils, sinusitis and numerous other conditions have all frequently been reported. However, these are conditions which are often found when looked for, and no comparative studies have been made on a controlled series of comparable patients, so that the possibility remains that the evidence of these focal infections is coincidental and not causal. The same objection applies to Dandy's[4] work, where in a search for causes in 215 cases of trigeminal neuralgia, he found 10% with a gross lesion apparently related to the production of the pain, 42% if he included arterial and congenital anomalies about the nerve root and disseminated sclerosis, 56% if he included aberrant venous branches, and 60% if he included adherent nerve roots.

It would seem, therefore, that at the moment it is only safe to conclude that the condition is unassociated with obvious changes in the nervous system, and may be related to infection or other diséases in the area of distribution of the nerve.

ETIOLOGY

Most neurologists will agree that women are more frequently affected than men, in the ratio of approximately two to one. It is, moreover, a disease of late middle age and early old age; of 1,119 cases seen by Wilfred Harris,[5] 80% fell between the ages of 41 and 70, with the majority in the sixth decade. Its hereditary incidence is uncommon but by no means rare. Wilfred Harris mentions a family in which there had been eleven sufferers from the disease in three generations. The site of origin of the pain is almost always in the second and third divisions of the nerve, and pain starting in the ophthalmic division is rare though it may spread into this area from the maxillary division after the passage of years. The occurrence of bilateral neuralgia has also been noted, and Wilfred Harris reported 85 such cases in his series, a percentage of just over 5% for the 56 of these cases seen in his private practice.

Other etiological factors are far less definite. Emotion, trauma and chilling have all been invoked as causal agents of the initial attack;

they may play a part, but in diseases of this sort the patient is apt unintentionally to mislead by his sincere desire to provide an explanation for his otherwise inexplicable but spectacular malady.

Perhaps the most interesting etiological consideration is the occurrence, by no means infrequently, of trigeminal neuralgia during the progress of a case of disseminated sclerosis. Numerous observers have noted this fact, and in 1939, Meredith and Horrax,[6] reviewed the literature for the preceding 17 years and found 25 reported cases out of 1,056 seen in private practice (3.7%). This relationship to disseminated sclerosis raises the whole problem of the site of the disorder and its causation. Since the plaques in disseminated sclerosis are found in the brain stem, at first sight this would suggest a central origin for the pain, but numerous objections can be raised to this theory, notably the fact that disseminated sclerosis causes paroxysmal neuralgic pain in no other site, although sensory symptoms of a paræsthetic nature are not uncommon. Moreover, were the pain to arise in the sensory nucleus or its connections, it is difficult to explain how it follows a peripheral distribution insofar as it affects the areas supplied by the ophthalmic, maxillary or mandibular, or combinations of these, and does not affect the face in the concentric distribution of the sensory nucleus of the trigeminal nerve. Were the pain to arise from a central site, it would be necessary to postulate that this abnormally activated site must be fired off by a dolorogenic zone in the face. It would appear that a more peripheral site must be sought, both from the distribution of the pain and from its spectacular relief by destruction either of the peripheral nerves or of the sensory ganglion. The very presence of a trigger zone also raises problems about neural re-activity which remain enigmatical. Wilfred Harris has for long strongly advocated the infective element in the causation of trigeminal neuralgia, and he feels that its occurrence in the distribution of the second and third divisions only confirms this idea, because it is over these sites that the areas of chronic infection are to be found.

It may well be that local disease of the face, if operative over a long period, results in changes in the Gasserian ganglion or its connections which cause an abnormal response from stimulation of the peripheral nerves.

SYMPTOMS

The symptomatology of trigeminal neuralgia is characteristic, and should give rise to no confusion. Some authorities speak of the "true" trigeminal neuralgias whereby they mean an idiopathic condition. This, however, is a false distinction since the symptoms are identical whether or not local disease of the teeth or sinuses can be demonstrated. The pain is quite characteristic, and always consists of paroxysms of severe pain which are usually confined to one division (the second or third) of the trigeminal nerve at the start, but which may later spread to involve two or three divisions. These paroxysms last only a second or so, but may occur on a background of dull, diffuse pain which may be continuous during the period that the paroxysms are occurring. Characteristically, the paroxysms are set off by physical stimulation such as eating, talking, fingering or washing the face, cold winds, trauma and emotion. At first apt to occur at infrequent intervals, they come in series lasting a few seconds or minutes and recurring more or less frequently over a period of a few days to a few months. In the early stages of the disease these periods during which series of paroxysms are occurring may be separated by several months or years of freedom from the pain, but as time progresses, the periods of freedom become shorter and the series of paroxysms last longer, until eventually they become almost continuous.

The quality of the pain has been variously described, and patients vary in their ability to endure it, but none can bear it with equanimity. The severity of pain is always difficult to assess, but in all those women whom I have questioned, and who have had children, none ever had any hesitation in describing the pain of labour as being infinitely preferable. Both men and women are usually agreed that it is also far worse than the worst toothache they have experienced. That it must be one of the severest pains to which mankind is liable can be guessed by any observer who has seen staid and unimaginative patients suddenly rendered inaccessible, and writhing in their short-lived agony. The gratitude and relief of those patients successfully treated is also indicative of the severity of their suffering and many of these subsequently express surprise at their ability to go on living when the pain was with them almost continuously.

Although the pain radiates all over the area of distribution of the trigeminal nerve, it never crosses the mid-line, nor radiates down into the neck or behind the vertex, a point of considerable importance in differentiating difficult cases of psychogenic pain in which, of course, injection would be disastrous. However, the dull ache which, as mentioned above, may form a background for the paroxysms, is not strictly confined to the area of distribution of the trigeminal nerve in the same way.

In spite of its spectacular symptomatology, this illness is not associated with abnormal physical signs, although a search should always be made for septic foci. Usually by the time the patient reaches a neurologist, all teeth, both good and bad, have been extracted in an endeavour to cure the condition.

DIFFERENTIAL DIAGNOSIS

As mentioned above, a typical case need cause no difficulty in diagnosis, but occasionally patients are seen complaining of the severest pain in their face, which may be thought to be due to trigeminal neuralgia if a detailed inquiry into the nature and origin of the pain is not made. In my opinion, many of these cases are of psychogenic origin, and their differentiation from true trigeminal neuralgia is of the utmost importance, since, should an alcoholic injection or sensory resection be attempted, these are the cases that later develop the complication known as trigeminal causalgia. If care is taken to eliminate these cases from those treated by injection or resection, I have never yet seen a case of trigeminal causalgia.

TREATMENT

Many forms of treatment for this condition have been devised, but only two are of any repute. No drugs are effective against pain of this severity, and these patients are notoriously resistant to opiates which little relieve the pain. Recently treatment by inhalation of trichlorethylene has been devised, but the rationale behind this is the unsatisfactory one that trichlorethylene is sometimes decomposed by soda lime to form dichloracetylene, which may cause a trigeminal analgesia in addition to other neurological disorders. It would not seem justifiable to treat this condition by adding a further neurological insult in the form of an intoxication which, in any case is uncertain in its effect.

The two reputable forms of treatment are surgical resection of the sensory root, and alcoholic injection of the peripheral nerves or the Gasserian ganglion. It is with the latter form of treatment that I am here principally concerned. At first employed by Pietres and Verger[7] at a time when neurosurgery was in its infancy, its chief advocate since then has been Wilfred Harris,[8] who, in the course of a long and active practice, saw and treated over 2,500 cases. Unfortunately, in recent years this form of treatment has fallen somewhat into disrepute, and Wilfred Harris best decribes the reasons for this when he says:

> "Even now its possibilities are insufficiently understood by the majority of the profession, and it is a commonplace to hear the statement repeated that alcohol injection gives only temporary relief, that it causes facial paralysis, that it is dangerous, and similar disparaging statements. The only ground for such belief is the poor results that will almost certainly follow from injections undertaken by beginners who have not been properly trained in the methods, and it is, I fear, a fact that numerous injections have been made by practitioners who should never have attempted them without previous thorough training and study of the anatomy of the parts."

The belief has grown up among practitioners and I have heard it frequently expressed that injection is of no use as a form of treatment and when one considers the frequency with which so many patients with trigeminal neuralgia have been subjected to ineffectual or even harmful attempts at injection, this is hardly surprising. For the same reason practitioners believe that permanent analgesia does not result from injection as indeed it does not from far too many of these ineffectual attempts. It has therefore become widely believed that section of the sensory root by the neurosurgeons is a far superior method of treatment. While in no way wishing to detract from the neurosurgical treatment, which is, of course, first-rate, it should be pointed out that no one other than a neurosurgeon of considerable experience would even attempt a craniotomy, much less the surgical approach to a cranial nerve. Since no elaborate surgical equipment is necessary for an injection, it is often too great a temptation for the over-bold to resist, since they blind themselves to the danger of the procedure in the hope that luck will enable them to achieve a spectacular cure. The two operations are not, perhaps, strictly comparable, but certainly no attempt should be made to pass a needle into the Gasserian ganglion by the uninitiated.

Alcohol kills all nerves with which it comes into contact, and the most tragic results have followed from injection of alcohol into the optic nerve, the Eustachian tube, or the subarachnoid space of the middle fossa. No doubt equally tragic results would have followed a neurologist's or general surgeon's attempt at resection of the sensory root by open operation.

Alcoholic injection aims at destroying either one or more of the three divisions of the trigeminal nerve, or at destruction of the ganglion where all three branches are joined. The former method has, to my mind, grave disadvantages; since it only destroys axones, the resulting sensory loss and relief from pain is not permanent and lasts from six months to three years; moreover, the approach to the maxillary nerve is difficult and hazardous, and to the ophthalmic nerve well-nigh impossible. Since trigeminal pain is rarely long confined to one branch alone, both this and the impermanence of the method has never seemed to me to justify its use.

Quite different, however, is the method of injecting the Gasserian ganglion. In this case neurones themselves are destroyed so that the resulting analgesia and relief from pain is permanent. Wilfred Harris indeed followed one patient for 31 years during which no recovery of sensation occurred, nor any recurrence of pain. In this method the ganglion is approached through the foramen ovale which is identified by anæsthetizing with novocaine the mandibular nerve that traverses it. When the nerve is pierced, in my experience as often as not, the patient complains of no especial pain and I have found pain referred to the chin or tip of the tongue to be not usual and the much described "spray" sensation to be uncommon. The entry into the nerve is realized by the examiner from a correlation of the position and depth of the needle, from the "feel" as it enters the foramen and confirmed by the high resistance offered by the nerve to the injection of novocaine and the distribution of the resulting analgesia. When the foramen has been identified it is usually easy to pass through it into the substance of the ganglion whose injection may then proceed. I consider that it is an absolutely cardinal rule that alcohol must never be injected unless it is beyond any doubt that the tip of the needle lies in the nerve or ganglion. Alcohol must never be used as a trial "to see what happens"! If this must be done, novocaine is reasonably safe. A minimal amount of alcohol should always be used; if 3 minims, of which a large percentage is used in filling the lumen of the needle, have not produced very considerable analgesia, some of which is due to neural shock, then the needle does not lie in the ganglion. But, as mentioned immediately above, to use this fact as a method of trial and error would be disastrous, since 3 minims of alcohol in the cerebrospinal fluid, optic nerve, or Eustachian tube will produce severe damage. Confirmation of the ganglion's destruction may be obtained from the conjunctival vasodilatation that occurs due to paralysis of the sympathetic fibres lying in relation to the ganglion. During injection of the ganglion which should never be hurried, some control of the distribution of the permanent analgesia may be engineered by manipulation of the end of the needle and noting the distribution of the burning sensation that accompanies the injection, and which indicates more or less the point of origin of the fibres being destroyed. By varying the amount of alcohol injected in each portion it is sometimes possible to spare in part one or more divisions which have not been affected by the pain and where retention of some sensation is of great help to the patient; this consideration applies especially to the eye, since neuro-paralytic keratitis is unlikely to occur if the eye is allowed to retain even the slightest appreciation of pressure. Production of too little analgesia, however, does leave the possibility that the pain will recur and the skill of the operator depends on his ability to strike a balance between these two extremes. I have usually found that the production of sub-total analgesia appears to avoid both complications.

Familiarity with the landmarks that the needle will meet at the base of the skull in the region of the foramen ovale, is absolutely essential, as also is the knowledge of the resistance which each of these structures offers to the passage of the needle and especially their resistance to novocaine injection. I would also add that patience is almost as valuable an asset since sometimes much time and trouble must be spent before success occurs; in part this is due to the quite considerable variations that occur between individual skulls. To attempt an injection in a hurry is to court disaster; however busy one is I have found it wisest to allot a half day for each injection, so that the whole procedure may be planned and un-

hurried and therefore successful; even when the ganglion has been reached, there must be no hurry since the worth of the result depends on the care with which the right amount of alcohol is injected in each change of position of the needle. For a full description of method I would refer the reader to Wilfred Harris' book *Neuritis and Neuralgia* (1926).

The advantage of this minor procedure, which necessitates only one night in hospital, is obvious over a craniotomy in which the middle fossa has to be approached, often with some difficulty. This is especially valuable since many sufferers are elderly and they can easily stand such a procedure; Wilfred Harris successfully injected a gentleman of 87 years, and I have recently had a similar result with a gentleman of 81.

The complications of alcoholic injection and resection are the same, and chiefly centre on the necessity for protecting the eye from neuroparalytic keratitis. Some authorities advocate an immediate tarsorrhaphy, but in the 25 injections that I have followed up over a few years, this has never appeared to be necessary, provided the danger is explained to the patient and an eye-shade advocated for the first three months, combined with the regular instillation of liquid paraffin. These 25 cases were followed for a period of one to four years, and still more for shorter periods, and none had developed this complication up to the time I lost contact early last year; such a run of luck, however, should not make one forgetful of the danger which remains very real. Other complications of the injection or operation are of a minor character and comprise self-injury by scratching the analgesic area, or biting the numb cheek when masticating food. Following the injection it is usual to find paralysis of the masseters on the same side, but since these motor fibres do not arise in the Gasserian ganglion, they rapidly regenerate and motor function is usually fully restored in six weeks to three months. A certain percentage of cases lose the sensation of taste over the anterior two-thirds of the tongue on the injected side, and this is difficult to explain if the taste fibres are, in fact, carried by the facial and glossopharyngeal nerves. If, as Nageotte showed, some fibres of the fifth nerve terminate in the upper part of the gustatory nucleus, it is possible that in addition to the seventh and ninth nerves, taste fibres may also be carried by the trigeminal nerve. However, the loss to touch over the tongue may well play a part in this apparent ageusia.

CONCLUSIONS

It would appear to me that the proper appreciation of alcoholic injection of the Gasserian ganglion as the treatment of choice in trigeminal neuralgia is long overdue, and that its abuse by the frequency of incompetent injections should not detract from its true value. Moreover it would seem to have advantages over surgical resection, not only in its simplicity in skilled hands and therefore its especial value in the elderly who could not stand any major surgical procedure, but also in the variations in the depth and distribution of analgesia that are possible. The patient greatly appreciates the retention of even that minimal amount of sensation left in what I call sub-total analgesia, and such cases also are less likely to suffer complications. It is suggested that more persons might become interested in this method of treatment and take the time and trouble to acquire the necessary skill, so that the extremely heavy load that now falls on neurosurgeons may in some measure be lightened, releasing them for the ever increasing and complex neurosurgical procedures that compete for their attentions. Moreover, this method of treatment should be to the patient's advantage insofar as it replaces a major surgical procedure by a minor injection. However, I feel very strongly that if these measures are adopted, that injections should only be practised after considerable preparatory work, both in the cadaver, and in assisting at injections, since a syringe-full of alcohol is a most deadly weapon if improperly applied.

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RÉSUMÉ

Revue de l'état présent de nos connaissances sur la névralgie du trijumeau. L'auteur insiste surtout sur le traitement par l'alcoolisation du ganglion de Gasser. Cette injection, pourvu qu'elle soit faite par des mains expérimentées, permet le plus souvent la disparition de la douleur. Dans ces cas, elle dispense les malades d'une intervention chirurgicale; elle est donc d'un avantage trés net, surtout pour les malades âgés.

PAUL DE BELLEFEUILLE

INDUSTRY AS A MEDIUM FOR THE PROMOTION OF MENTAL HEALTH*

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THE terms "health" and "industry" are considered so frequently in our daily work and conversation that their full significance is apt to be missed. In July, 1946, the charter of the World Health Organization was formed. It contains the following definition—"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".

The implications of this definition are challenging, to say the least. No longer can we delude ourselves into thinking that we are accomplishing our purpose by concentrating on any one aspect of health. Organic disease invariably provokes psychological disturbances of varying degrees of intensity, which may or may not be further reflected in the well-being or stability of the family. Conversely, an inadequate home or community environment may be the basis for severe psychological disturbances, which can be significant factors in the production of organic disease. A recent survey in Canada indicates that the areas with the highest standard of physical health, optimum control over contagious diseases and lowest infant mortality rate, are the identical communities with the lowest birth rate, highest divorce rate and highest incidence of alcoholism. One could justifiably question the degree to which the total well-being of these communities had been enhanced by this uni-directional hygienic effort.

Although the title of this paper is "Industry as a Medium for the Promotion of Mental Health", I hope to establish that the promotion of mental health must go hand in hand with the promotion of physical and social health and that industry is the medium of choice in this endeavour.

The physical and mental aspects of health in industry have received more publicity in the past five years than in all the years before. Not only are there now two journals on industrial health published in the United States, but more and more frequently do we encounter articles on this subject in other medical publications. It is not my purpose to attempt to duplicate or summarize the valuable material already published. Rather, I hope to round out the practical aspects of the definition mentioned above, by considering briefly the meaning of sociopathology, socio-therapy and social hygiene and to relate these findings to the aspects of health that have already received wide recognition.

The social *requirements* for health must be identified before we can discuss disease, treatment or prevention. These requirements are still controversial, but outstanding sociologists are in agreement on at least two fundamental points. One, that man is a social being and requires a social framework—a home plus a community life —and two, that he can only acquire full maturity, health and the satisfactions of living through active co-operation with his fellow men within this framework. Harry Elmer Barnes, outstanding sociologist, author of *Social Institutions* and *Economic History of the Western World*, expresses these concepts as follows:

> "Man's peculiar physical nature and biological equipment are such that he has been compelled to associate and co-operate with his fellow men for the purpose of ensuring his existence, comfort, protection and progress." And again: "Man has been compelled to compensate for his physical weakness by co-operative social endeavour with his kind."

In other words, man has only survived through evolution as a "social" being. This has been recognized since the time of Aristotle, who first used the words "social being" as applied to man. We were not strong enough to travel alone like the lion or grizzly bear, we survived through co-operative effort only. The fact that man must co-operate with his fellows is not a moral concept, but a social law of health, and it implies the absolute necessity of an adequate social framework or home and community life to facilitate co-operative endeavour. Sociopathology refers to functional and structural disturbances of the social framework and particularly of the smallest social unit, the family. Social illness is revealed in such conditions as divorce, separation, alcoholism, juvenile delinquency and crime. The repair and prevention of these conditions come under the headings of socio-therapy and social hygiene respectively.

To better understand industry, as well as the contribution of industry to impaired general health, we must appreciate its rate of growth

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since the industrial revolution. In his *Economic History of the Western World,* Barnes described our material progress up to 200 years ago, as follows:

> "The outstanding improvements in material culture since the Stone Age had been the art of utilizing metals, the development of the science and art of navigation, and the invention of printing. Industrial establishments were small and simple, and personal relationships between employer and employee existed in nearly every case."

The neolithic or late "stone age" was approximately 10,000 years ago. Within the last two hundred years, man has made more material progress than he had in the previous ten thousand. This ten thousand year period, however, provided the basis for our social institutions. Suddenly, with the discovery of the steam engine, electricity, etc., the established social patterns were disrupted. They were further complicated by the invention of the motorcar, aeroplane and our modern means of communication.

Probably the most significant development has been the inability of man to re-establish an adequate community life in the industrial setting. This fundamental human need has not been altered by any of the material changes of the past two centuries. A routine survey of the employees in practically any industrial setting today would reveal an appalling lack of the two requirements for social health that have been mentioned. It is difficult to become intimately acquainted with either one's neighbours or fellow workers, and both change too frequently for permanent friendships to develop. One is particularly impressed by the loneliness of many at the labour level. Strangers to the city are still strangers one or two years later. Routine examination into the home conditions of working people reveals an alarming frequency of actual or impending divorce and separation. Young married couples accept it as normal that they should be able to find two rooms in a crowded house and that children are frequently not wanted. The tensions, frustrations and depressions arising from this hopelessly unhealthy setting are reflected not only in impaired efficiency and productivity within industry, but frequently in forms of anti-social behaviour that further contribute to general turmoil. Thus, industry has *very* seriously brought about impaired health from the social standpoint.

The psychological disturbances resulting from the increasingly complex, technical framework of modern industry are legion, but only one of them can be considered in this paper. In earlier times, craftsmen working for themselves in smaller concerns, were readily able to perceive the results of their work in terms of the social needs of the community and to derive direct satisfaction therefrom. This is the natural and healthy outlet for the "mastery drive". The "mastery drive" or drive for achievement, provides the basis for the need within us to succeed, to overcome obstacles, to achieve a definite end and in this way, find an adequate medium for self-expression. It has its origin in a state of emotional tension, which tension is only relieved when one is able, periodically, to accomplish one's purpose. An unrelieved state of emotional tension will result in some form of maladjustment. It may become evident in various psychosomatic complaints, such as headache or fatigue, or in any form of non-co-operative or unreliable behaviour. As industry has become more complex, opportunities for a sense of satisfaction and achievement from the job itself have become progressively less.

From the physical standpoint, industry exposed man to a complexity of new physical and chemical health hazards. In fact, a new field of medicine, a new specialty, is represented in this study alone.

Summarizing to this point, the definition of health, as provided by the World Health Organization, has been accepted and discussed. An attempt has been made to demonstrate industry's contribution to ill health. The remainder of the paper will deal with the therapeutic and hygienic opportunities of the physician in the industry.

Four points dealing with the general aspects of his position will be first presented. (1) He is at the very hub of the uncontrolled, non-directional, materialistic effort that so vitally endangers our well-being as to constitute a menace to our existence. From the standpoint of his training and professional status, he is the most ably equipped individual in the industrial environment to give objective and unbiased guidance in modifying this trend. He is in a position to demonstrate to business leaders that the social sciences are in every way as significant for industry as the technical sciences. He should

also be in a position to realize that *until* business and industrial leaders are convinced of the necessity and practicability of applying the technical and social sciences together, no appreciable change in our social situation will develop. (2) The industrial physician has the advantage and responsibility of being one of the few members of the medical profession in civic communities with the opportunity to acquire a close insight into the physical, mental and social problems of a specific adult group. (3) His hygienic efforts are concerned with the head of the family, or breadwinner, so that any new concepts of health acquired by them have a good chance of being re-applied to affect the well-being of the rest of the family. (4) His is practically the only medium that does not depend on public funds for its maintenance.

Before dealing with specific therapeutic or hygienic techniques, we must consider the fact that an industrial health department must as soon as possible, justify itself from a dollar and cents standpoint like any other department within the industry. This leads to the logical conclusion that the time spent by doctors and nurses must result in the prevention of conditions that are costly to the firm. Hygiene thus assumes preference over therapy within industry. Therapy must be undertaken to a certain degree but be confined to ambulatory disorders, and this applies to all types of therapy. Serious surgical, medical, or psychiatric conditions are treated outside the plant. Since the industrial physician usually becomes better known to his employee group than any other physician, he becomes the consultant for an amazing variety of problems not connected with physical health. The problem we have all had to face is how to best utilize our time in trying to assist these people. The following suggestions are submitted:

1. If the industrial physician finds that he has not been adequately trained to treat the milder psychogenic disorders and to give advice in mental and social hygiene he should first take advantage of the wealth of material now available and try to equip himself for this work. He would gradually become proficient in recognizing early, the cases that should be referred to a psychiatrist and those that will respond to his care. Since he has the unique opportunity of dealing with psychogenic disabilities at a much earlier stage than either the private physician or the psychiatrist, he will be amazed at how dramatically many of his patients will respond.

2. It is equally important that industrial nurses acquaint themselves with psychogenic disorders, *e.g.*, they must try to understand the chronic absentee offender or the man with a chip on his shoulder and appreciate something of the psycho- and socio-pathology that may have produced the condition.

3. We are assuming that the status of individual and group health has been already ascertained by the pre-employment or periodic examination, and that the various forms of ill-health have been identified and sorted. The physician is now in a position to give guidance to any group of employees suffering from comparable disabilities. This is a point that I want to stress. Group psychotherapy was first generally used during the recent war. I am referring however to group therapy for physical and social ill-health as well. If we can give advice to fifty people in the same time that we would take to give it to one, we have utilized our time to better advantage providing we still get results. Actually the results will be as good or better. You provide a group of people with a new common problem, and make it possible for them to have an added basis for co-operation and mutual understanding. Thus any group effort—whether dealing with care of teeth, feet, functional dyspepsia or the housing problem, is automatically a beginning, at least, in socio- and psycho-therapy. Any contribution by the health service in promoting group projects either within or outside of the plant, is a beginning in socio-therapy. Specific socio-therapeutic measures such as finding adequate housing and particularly towards finding a home in an adequate community setting are practically impossible. However, the employees as a group deserve to have the fundamental importance of these things explained to them. We are apt to underestimate labouring people and forget that their routine tasks need not necessarily indicate the real level of their intelligence and ingenuity. The psychologist, William James, made this statement: "The human individual lives actually far within his limits. He possesses power that he habitually fails to use". A few years ago a group of Pennsylvania miners pooled their funds and technical skills, bought a tract of land within commuting distance of their work, built their

own homes, grew much of their food and established a community.

There is a form of socio-therapy in operation that has received considerable recognition this year by industrial physicians in the United States. I refer to the association of Alcoholics Anonymous. Alcoholism is an illness that very clearly involves the three aspects of health but if effective treatment is an indication of basic pathology alcoholism is primarily a social sickness. Attempts to successfully treat alcoholism from either a physical or psychiatric standpoint have seldom resulted in more than 35% recoveries. On the other hand, Alcoholics Anonymous, working in collaboration with medicine, has proved statistics of at least 75% recoveries. Theirs is a group effort and the initial steps in the recovery of the alcoholic are made possible by the protection offered by the group. The techniques in operation in A.A. deserve close study, for I am personally convinced that they have discovered a socio-therapeutic method in keeping with our rapid pace of living that might be re-applied to many other social ills.

There is time to mention a few techniques in social and mental hygiene. It must be kept in mind that social hygiene can only become a reality when industrial management decides to make it a reality. Social hygiene is considered first.

1. Business leaders should realize their responsibility when erecting new plants and take into consideration that adequate housing for their employees must be provided. Unless this is done, any industrial project that attracts more people to an already over-crowded community only contributes to ill health from every standpoint.

2. The plight of the head-rollers in the tin-mills of Western Pennsylvania provides us with an excellent example in considering another technique in social hygiene. The head-rollers were brought in originally from Wales. Elton Mayo, in his book *The Social Problems of an Industrial Civilization* outlines the situation as follows:

> "For years in Pennsylvania they prospered, owned the houses they lived in and became persons of some weight and prestige in their communities. Quite suddenly, after the depression of the early thirties, the method of manufacturing tin plate was radically changed, and these men, many of them in later middle age, found themselves without an avocation and without means of continuing to support themselves and their families in the way of life to which they had become accustomed. This was for them a personal calamity of the first magnitude. They drifted downwards toward profound personal depression, and their attitude to themselves and to society might be described as one of complete loss of confidence."

As technical research allows machines to take over the work of skilled labour, this type of situation is repeated over and over again in all kinds of industry. There would appear to be at least one logical solution. When technical research indicates that a new development will put a percentage of the employees out of work, there must be a social research department to protect this group of people. The period of technical research for a particular development could correspond to a training period to re-fit those affected for other employment in new skills compatible with their intelligence and technical ability. Elton Mayo expressed this need as follows:

> "Unless this is done we shall find technical advancement provocative of social chaos and anarchy. If our social skills (that is, our ability to secure co-operation between people) had advanced step by step with our technical skills, there would not have been another European war."

If by comparable social hygiene techniques, the intra- and extra-industrial environment of the worker could be stabilized, we would be in a position to suggest more practical techniques in mental hygiene. We know that in many cases the job itself will never supply the means of an adequate sense of achievement. There will be no significant return to craftsmanship. Thus, the sense of achievement must frequently arise from effort outside of the industrial environment. In an improved social situation, the employee should be able to experience a sense of achievement and importance from his contribution to the general welfare of his home and community. At the present time there is too much concentration on trying to correct industrial maladjustments by placing the "square peg in the square hole". This concept does not take into account the adjustive abilities of the individual. If an employee can have a sense of achievement, social approval and security from his job, plus his outside associations, his job could be any one of several in most cases.

It becomes necessary, however, to view the situation from a practical standpoint. There is no specific training for the industrial physician in Canada up to the present time. The approach to the health problems of a particular industry are as diverse as the personalities in-

volved. As a medical group, we have at least three clearly defined responsibilities. The first is to acquaint industrial leaders with the social sciences. Industry has progressed to the degree that management has had the courage and ingenuity to translate new scientific fact into general, practical reality. Psychology and sociology can be as profitably applied to industry as chemistry, physics or engineering. Industry, rather than the universities, professions or government agencies, must take the lead in social stabilization, if the desired goal is to be achieved in time. Our second responsibility is to see that adequate training for the promotion of health in industry, at both the undergraduate and postgraduate level, is provided. At the present time, the industrial medicine section of the Ontario Medical Association is proposing to the four medical schools in Ontario an educational program of this nature. Our third responsibility is to immediately enlist the aid of authorities in mental and social hygiene. We must attempt to correlate our efforts with those of civic, provincial and dominion mental and social hygiene committees. We must have the courage to consider the possibility that we have been placing the cart before the horse in our hygienic efforts to date. It is possible that the social framework must be first stabilized before any constructive effort in mental hygiene will be possible. If this is so, then the effort of those concerned in the promotion of mental health must be directed more definitely towards industry.

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RÉSUMÉ

L'hygiène mentale constitue une forte partie des fonctions du médecin industriel. Celui-ci occupe, en effet, une situation-clé. Il exerce une influence sur la direction, et peut grâce à elle contre-carrer la tendance de l'industrie contemporaine à oublier l'individu et, plus particulièrement, l'importance du logement familial. Son influence porte aussi directement sur les employés eux-mêmes et, à travers eux, sur leurs familles. Il est donc mieux placé que quiconque pour exercer une véritable médecine sociale. Son rôle y est d'autant plus efficace qu'il n'est pas rémunéré par l'Etat; d'ailleurs, les fonctions du médecin industriel apparaissent indispensables aux conseils d'administration dans la mesure où leur exercice même constitue un avantage économique. Le médecin industriel a l'occasion de traiter à la fois l'individu et son entourage, ou, plus précisément, *dans* son entourage: la thérapeutique de groupe est un moyen ensemble simple et efficace, tout indiqué pour le traitement des maladies sociales, dont l'alcoolisme est un exemple.

PAUL DE BELLEFEUILLE

OBSERVATIONS ON THE USE OF MYANESIN IN PSYCHIATRIC CASES*

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IN 1946, Berger and Bradley, during a systematic investigation of the α substituted ethers of glycerol, observed that certain of these compounds produced, in laboratory animals, paralysis with profound muscular relaxation.[1] α: β-dihydroxy-α-(2-methylphenoxy)-propane, called myanesin, exhibited the greatest potency and the widest margin between the paralyzing and lethal doses. The pharmacological properties of this compound were investigated extensively by these authors.[2] Mallinson subsequently used myanesin in anæsthesia as "a curarizing agent", and felt that for this purpose it was, in some respects, superior to curare.[3] These investigators felt that the action of the drug was probably that of depressing the reflex excitability of the spinal cord.

Clinical investigation of myanesin has been carried out at the Verdun Protestant Hospital and elsewhere since the spring of 1947, and has been reported by Stephen and Chandy[4] of the Montreal Neurological Institute. Briefly, the findings are that myanesin in doses of 30 mgm./kilo. in man, produces a generalized muscular relaxation without, however, impairing voluntary muscular control. It has been found that the drug, in these doses, has a specific inhibiting effect upon the tremor—rigidity syndromes related to lesions of the basal ganglia and upon pain of thalamic origin. It does not inhibit spastic conditions or paræsthesias related to lesions of the spinal cord. It does not impair normal peripheral sensory function. In our cases no untoward respiratory or cardiovascular effects were noted. We have, however, confirmed the observations of others,[4, 5] that in some cases hæmaturia develops a few hours after injection of the drug. One patient complained of "a dark red colour to the urine", frequency, urgency and painful micturition starting about four hours after receiving the drug and lasting about twelve hours. Urinalysis at that time revealed albumen 1 plus, mixed casts 2 plus, benzidine test 1 plus, red blood cells 1 plus. Urinalysis one week

* This paper is published with the kind permission of Dr. George C. Reed, Medical Superintendent of the Verdun Protestant Hospital.

later was negative. There is, in the literature, at least one report of a death attributed to myanesin. In this instance the drug was used in conjunction with general anæsthesia. Necropsy revealed gross and microscopic evidence of renal anoxia.[5]

Myanesin has been investigated at the Verdun Protestant Hospital primarily to determine its usefulness as a premedication for electric shock therapy; in view of reports and of observations of its muscle-relaxing properties, it was of interest to discover whether the drug would possess any advantage over curare in this respect when used with electric shock treatment. An effort was also made to discover any psychiatric uses myanesin might have insofar as psychotic patients were concerned.

Twenty patients received myanesin intravenously in doses of 30 mgm./kilo., the drug being injected at the rate of 2 c.c./minute. In six of these cases the drug was administered immediately before electric shock treatment. All the cases receiving the drug were psychotic; among them were seven schizophrenics, five manic-depressives, four cases of Parkinsonism with psychosis, one case each of cerebral arteriosclerosis with psychosis, postpartum psychosis, involutional melancholia, psychosis with spastic condition related to brain tumour.

Objectively, myanesin, in the doses used, did not diminish either the intensity or the duration of the convulsions of electric shock treatment. The patients receiving the drug as premedication had all had several shock treatments, both with and without curare, so that one knew quite well the customary intensity and duration of the seizures of each. By this method of observation, myanesin did not appear to modify the convulsion in any way. The immediate post-treatment period did not appear to be affected in any way by the drug.

Subjectively, the patients receiving myanesin experienced various effects immediately following injection of the drug. Fourteen reported a feeling of warmth about the head and neck, which was accompanied by a flushing of these parts. Twelve remarked upon a general feeling which was most often described as "pleasant", although there was some variation in the degree of pleasure experienced. One patient simply remarked that she felt "pleasant". Another described a "pleasant and relaxed sensation". Still another, a paranoid schizophrenic, became quite euphoric and repeatedly exclaimed, "I feel wonderful!" Three patients noticed a peculiar taste, which they described as "iodine" and "alcohol"; one patient smelled the drug. Five patients reported a transitory dizziness; and of these two experienced a brief diplopia and blurring of vision; one patient became nauseated but did not vomit; one patient complained of severe pain extending up the arm from the site of injection; this pain disappeared almost immediately upon withdrawal of the needle and there was no subsequent evidence of local irritation.

Myanesin had its most marked effects upon patients with Parkinsonism. One such patient stated that a persistent head noise disappeared completely for about twenty minutes following injection of the drug. Another Parkinsonian stated that a tense, painful sensation in his shoulder muscles disappeared following an injection of myanesin and did not return for four days. All the cases of Parkinsonism remarked upon a diminution in muscle tension following the injection. The duration of this diminution in tension was found to vary; in one case it was ten minutes, and in another the tremor began to reappear three days after the injection, although the sense of muscle spasm had not returned after a week. One has the impression from these cases that the more recent the onset of the Parkinson syndrome, the longer the remission of symptoms following myanesin. Of the cases of Parkinsonism receiving myanesin, all reported a subjective improvement following the drug, as well as an objective diminution of the tremor-rigidity syndrome. The duration of the improvement was highly variable.

The patient whose psychosis was related to cerebral arteriosclerosis presented a tic involving the right side of the face and the right arm. This was abolished for 15 minutes by myanesin. The patient stated she experienced "a pleasant warm feeling, like after a hot bath". This patient was depressed and suicidal with delusions of self-accusation. Following the injection she became composed and was somewhat less disturbed by the thoughts of her transgressions, real or imagined. This composure lasted about half an hour and was quickly replaced by the depression and agitation.

The patient with a spastic condition related to a brain tumour exhibited the facial flush together with a marked diminution in muscle tone. After a few c.c. had been injected the patient stated that he felt "groggy". Following the full injection he became cheerful and expressed an

optimistic attitude towards his condition. This affective change lasted about an hour.

In the case of the patient with involutional melancholia there was a very slight flushing of head and neck. Subjective changes were apparently minimal; there was some slight diminution of tension and the patient complained of a faint dizziness. These changes disappeared within 15 minutes.

The seven schizophrenics who received myanesin presented the somatic effects characteristic of the drug. In all cases there was the diminution in muscle tone, together with a feeling of warmth about the head, and flushing. Four either "tasted" or "smelled" the drug. Psychic effects were observed in four cases and varied from a feeling of pleasant relaxation to actual euphoria. No other change in the mental condition of any of the patients was noted. These subjective changes lasted, on the average, less than half-an-hour. The three cases in which no psychic effects were noted were deteriorated catatonics who remained mute.

Of the five manic-depressive patients, two who were depressed felt "pleasant" and "a bit more relaxed" following the drug. One depressed patient reported no subjective change. One hypomanic patient became slightly less restless. One case of a mixed type complained of nausea, but did not vomit. The effects of the drug, subjectively, in this group were not marked and none lasted as long as half an hour.

DISCUSSION

That myanesin produces well-recognized physical changes and less well-recognized mental changes in humans has been seen. The site of action of the drug is generally felt to be somewhere in the basal ganglia, by reason of its definite, though transitory effects in eliminating or diminishing the tremor and rigidity of the Parkinson syndrome without in any way impairing voluntary muscle control. That thalamic activity is somehow modified by myanesin is suggested by the relief afforded by the drug to pain of thalamic origin, and possibly by the undifferentiated feeling of well-being, sometimes amounting to euphoria, which often follows the use of the drug.

It is felt that the duration of action of myanesin, which is brief when the drug is given intravenously, might be prolonged should the drug prove effective when given by mouth.

The hæmaturia which sometimes follows the use of myanesin appears to be on the basis of hæmolysis with resultant renal hypoxia. Some work has been done which suggests that the causative factor in the hæmolysis may be the solvent in which the myanesin is put up and not the drug itself. The solving of this problem is of obvious importance in the future clinical use of myanesin.

CONCLUSIONS

1. Given intravenously in doses of 30 mgm./kilo., myanesin does not modify the intensity or duration of the convulsion of electric shock therapy, nor does it affect the immediate post-shock period.

2. In psychotic patients with the Parkinsonian syndrome, the drug may produce a remission of the tremor and muscle rigidity, together with a feeling of well-being and of hopefulness. The duration of the remission varies between patients, but is usually brief.

3. In psychotic patients without basal ganglia disease, myanesin may produce certain psychic phenomena, chief of which appears to be a feeling of relaxed well-being. This varies in degree from slight relief of tension or depression to actual euphoria, and is of brief duration. Somatic effects are seen and consist chiefly in diminution of muscle tone without interference with voluntary muscle control.

4. Unpleasant effects may appear in the form of dizziness, nausea and pain at the site of injection.

5. In an undetermined percentage of cases, hæmaturia develops following the injection of myanesin. It is felt that this may be related to hæmolysis, with resultant renal anoxia.

6. The findings in this series of cases tend to support the view that myanesin has its principal action in the basal ganglia and possibly the thalamus.

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RÉSUMÉ

La myanésine est un éther-sel du glycérol substitué en position alpha. Il fait partie d'un groupe de corps d'origine expérimentale capables de produire chez les animaux une paralysie généralisée avec atonie totale. On l'a employé en anesthésie, humaine, aux mêmes fins que le curare, auquel il se serait montré supérieur. Le présent article rapporte l'usage de la myanésine comme agent de relâchement musculaire dans la convulsion-

thérapie par électrochoc de certaines psychoses. Les doses intra-veineuses de 30 milligrammes par kilogramme de poids du malade n'ont pas paru modifier l'intensité ni la durée de la convulsion, ni changer l'état du malade dans la période suivant immédiatement le choc. Tous les malades souffrant de parkinsonisme ont bénéficié d'un mieux subjectif de durée variable. La sensation de bien-être et de relâchement de la tension s'est aussi manifestée chez beaucoup de malades dont les noyaux gris centraux ne paraissent pas affectés. Ces phénomènes se manifestent objectivement par une diminution du tonus musculaire sans perte de la motricité volontaire. Par contre, on a rencontré du vertige, de la nausée et de la douleur au point d'injection, symptômes transitoires dans tous les cas. Un certain nombre de cas ont présenté une hématurie, vraisemblablement par hémolyse et ischémie rénale. L'auteur est d'avis que la myanésine exerce son action au niveau des noyaux gris centraux et, peut-être aussi, à celui du thalamus.

PAUL DE BELLEFEUILLE

ROENTGENTHERAPY OF PAIN*

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TREATMENT of pain by x-rays is far from being new. It is as ancient as radiotherapy itself. As early as 1897, Gocht had observed the cure of neuralgia of the trigeminal nerve, after an irradiation of that nerve. Then, in 1890, Stemo observed the disappearance of pain from patients suffering with neuralgic or articular pains, following radiological investigations. These results encouraged him to irradiate a series of various neuralgias, with surprising success. Many radiologists followed him in this work and now we can affirm that x-rays over painful regions of the body undoubtedly have the power of relieving pain.

ANATOMICAL AND PHYSIOLOGICAL KNOWLEDGE OF THE NERVOUS SYSTEM

It is necessary to recall our knowledge of the anatomy and the physiology of the nervous system if we are to understand: (*a*) what is pain; (*b*) which are the causes that can produce pain; (*c*) by what mechanism x-rays act on pain; (*d*) which are the pains particularly relieved by x-rays, and (*e*) which radiotherapeutic procedure should be established in the principal types of pains.

1. *Our relation life* is ruled by a nervous system enclosed in the brain and spinal cord, through the medium of 43 pairs of nerves. Twelve of these 43 pairs emerge from the brain, and come out of the skull through foramina or canals, surrounded by fibrous tissue. Then, the cranial nerves run to the organs of senses, to the muscles, and to the coating surfaces of the skin and of the cavities of the head and neck. Some of these cranial nerves have a sensory function, some have a motor function, and others have a sensory and motor function (called mixed function). These nerves have special end receptors, with a vascular net. We will see later the importance of that vascular net, in the mechanism of the action of x-rays on pain.

The 31 other pairs of nerves come out of the medulla of the spinal cord, and are called for that reason "spinal nerves". They pass through meninges and through intervertebral foramina where they are invested by dura and sheathed by connective tissue. It is important to note that before running to their destination, some of these nerves associate to form plexuses: cervical plexus, (C_1, C_2, C_3, C_4); brachial plexus C_5, C_6, C_7, C_8, D_1); lumbar plexus (L_1, L_2, L_3, L_4); sacral plexus (L_5, S_1, S_2, S_3, S_4) and sacro-coccygeal plexus (S_5 and filum passing over the first coccygeal vertebra). We shall see the rôle of these plexuses, when explaining the procedure for the treatment of some neuralgias. Let us remember that all the spinal nerves are mixed nerves and that all their sensory receptors are surrounded by a vascular net.

2. *Our vegetative life* is ruled by special plexuses and special nervous ganglia, placed outside the cerebrospinal axis. These plexuses, which give innervation to all the organs of the body and to vascular vessels, are mostly formed by fibres coming from the tenth pair of cranial nerves. These two nerves, originating in the medulla oblongata and running down both sides of the neck, through the thoracic cavity, crossing the diaphragm, and ending in the abdominal cavity, have received, because of their length, their numberless branches, and their manifold functions, the name of vagus nerves. The vagus, which is a mixed nerve, constitutes the parasympathetic system. In its formation there are a few branches coming from the glosso-pharyngeal, hypoglossal, facial, and also from the sacral enlargement of the spinal cord.

The ganglia, placed on both sides of the spine, are joined by filaments and they form the sympathetic system. This system has many branches, communicating with the parasympathetic system.

The vagus nervous system and the ganglionar sympathetic nervous system have opposite functions in each organ, and balance the physiological functions of the organs. They control the motility of the arterial vessels, and they play an important part in the appearance and the disappearance of pain.

NATURE OF PAIN

Pain is a disagreeable sensation, awakened by external or internal irritation of the sensory branches of the nerves. When a sensory receptor is stimulated a depolarization appears between the axis and the periphery of the sensory fibre. It has been demonstrated by some American physiologists that such a depolarization of a nervous fibre causes a displacement of ions inside of that fibre. This displacement of electric charges, is probably what we call "nervous influx".

Pain is felt when the intensity of the nervous influx varies, or when the modification of the conductibility of nerves is such that our nervous centres receive disturbed sensations. We have to remember that painful sensations may be transmitted not only by sensory fibres, belonging to our relation system, but also, by some fibres belonging to our vegetative system. Several

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vague, deep, strange pains, which patients cannot describe or which physicians cannot always understand, are pains proceeding from the sympathetic system. Therefore these pains should be treated by adequate therapy on the sympathetic ganglions.

CAUSES OF PAIN

We know that pain is the signature of a nerve irritation. All kinds of irritation of the sensory nerve may cause pain. As mechanical irritations, we may mention: exostoses; vertebral malformations; protrusion of intervertebral disc; cancerous metastases in bones, in lymphatic glands near bones, or in the pelvic cavity; and also inflammatory reactions of nerve sheathes inside the fibrous-osseous foramina or canals. Without insisting on the physical irritations by heat and cold, and on the chemical irritations such as those produced by lead, or by blood modifications by hormones (lower concentration of calcium, higher pH), we may note that irritations by infections or inflammatory conditions, such as tuberculosis, gonorrhœal arthritis, herpes, etc., are produced partly by compression, and partly by toxic action.

The vasomtor disturbances of small vessels surrounding terminal ends of nerves, directing their metabolism, and consequently influencing their normal functions, may be responsible for causing pain.

HOW X-RAYS RELIEVE PAIN

Several theories have been put forward to explain the sedative action of x-rays. They may be classified in two categories: those implicating a direct action of x-rays on the nervous elements, and those producing an indirect action on the nervous elements, by humoral modification.

As striking results from direct action of x-rays on the nervous elements, we may mention the following: diminution of the excitability of the nervous endings, and modification of the conductibility of nerves by a photo-electronic effect. Unfortunately these physiological modifications of the x-rays have no histological substratum. Langer observed a direct action of the x-rays on the sympathetic ganglion and on the vagus nerves of cats and dogs after irradiation of each nerve dissected out. The x-rays produced an inhibition on both nervous systems of animals subjected to Langer's experiments.

Zimmern and Chailley-Bert irradiated the vagus nerve of dogs and observed a diminution of excitability of nerves; a diminution of the amplitude of the oscillation of pulse, and an acceleration of the cardiac rhythm. They also observed a diminution of the ocular-cardiac reflex. These experiments constitute an excellent physiological proof of the sensibility of vegetative nervous system to x-rays. Another similar observation made many times by all of us, is the vaso-dilatation (erythema) produced by x-rays. This vaso-dilator effect, associated with sedative effect, renders roentgentherapy a therapeutic procedure similar to surgery of nerves.

Irradiation of the paravertebral ganglia gives similar results to those of the surgery of sympathetic nerves; while irradiation of the vasculo-nervous cross-roads (such as neck, axilla, popliteal fossa, femoral triangle) gives comparable results to the periarterial sympathetectomy of the limbs.

The inhibition or paralytic effect of x-rays on sympathetic nerves seems now demonstrated. The sympathetic nerves running in the walls of arteries and the cerebrospinal nerves ending in the net of small vessels (surrounding sensory receptors) are meeting each other in the skin. This anatomical disposition explains the action of x-rays on pain. The beneficent action of superficial treatments, such as heat, electric currents, infra-red and ultra-violet rays, on visceral pain, is explained through the same mechanism.

Among the theories of the second category (indirect, humoral action) let us remember only the following one. Dubois-Ferrieres, analyzing the vaso-dilator substances from destroyed cells, found that triphosphate of adenosine, which is a normal component of the nucleus, is a powerful vaso-dilator of the capillaries. So, Gilbert thought that x-rays, by destroying white cells, could produce the liberation of triphosphate of adenosine. He thought also that nucleo-protein where it is liberated, should provoke the vaso-dilatation of capillaries, modifying the nutrition of the sensory receptors and consequently should relieve pain.

Whatever the way by which the x-rays act on the pain, be it by direct or indirect action, or by a combination of both, or even by the simple destruction of inflammation compressing nerves, there are clinical facts that x-rays relieve pain.

INDICATIONS FOR X-RAYS IN THE TREATMENT OF PAIN

In principle, x-rays are indicated in all types of pain, arising from (1) known causes such as, inflammatory lesions, tumours, vaso-motor troubles; or from (2) unknown causes, as is the case for essential neuralgias.

Inflammatory lesions.—We all know the sedative effects of x-rays on carbuncle of the upper lip, on gonorrhœal arthritis of knees, on rheumatic arthritis of hips, spine and knees, and also on periarticular fibrositis, specially at the shoulder. Our colleague, Dr. Lacharité, who published an excellent paper on x-ray treatment of pain, in *l'Union Médicale,* April, 1946, reported many cases of scapulo-humeral arthritis, treated by x-rays. His results were excellent, even in the cases having calcareous deposits.

Tumours.—In the cancerous metastases developed in bones or lymphatic glands near the bones, roentgentherapy can avoid, very often, the use of strong sedatives, thus eliminating the disturbances of mental faculties and of normal function of all organs. This is particularly valuable when a patient is the father or the mother of many children. In the pelvic metastases, the results do not last very long, and are not so good as in the other metastases, but we think that they are worth trying. In Hodgkin's disease with metastases, localized inside or close to a bone, x-rays are the best treatment to relieve pain.

Vaso-motor disturbances.—In these troubles, para-vertebral roentgentherapy gives appreciable results: intermittent claudication improves; tingling and coolness of limbs are also remarkably influenced.

In angina pectoris, roentgentherapy is not a treatment of the crisis, but is designed to attenuate the crisis. It gives favourable results in 50% of cases, probably by lowering the threshold of excitability of the cardiac plexus in provoking a vaso-dilatation.

ESSENTIAL NEURALGIAS

The essential neuralgias are generally named after the nerve serving a painful region: radial, cubital, sciatic, etc. However, it is sometimes different. For instance, facial neuralgia, is not a pain in the facial nerve (motor nerve) but in the trigeminal nerve that innervates the face (sensitive branch). Roentgentherapy usually gives excellent results in most essential neuralgias. But neuralgias originating in a plexus can also give distant pain in any part of the territory disserved by this plexus. So, when roentgentherapy in a painful region gives no result, we should irradiate the plexus. Many times we have obtained surprising results by this irradiation of the roots, after a complete failure of the local irradiation.

GENERAL TECHNIQUE FOR THE TREATMENT OF PAINS

1. When pain is caused by inflammatory conditions, we administer semi-penetrating x-rays (140 Kv. 0.5 copper) by small doses (50 to 100 r) every day or every other day.
2. When pain is caused by cancer we administer very penetrating x-rays (250 Kv. 2 mm. Cu.) by heavy doses 250 to 350 r), two or three times a week.
3. When pain is caused by vaso-motor troubles we administer moderate doses with semi-penetrating x-rays (120 to 135 r; 140 Kv. 0.5 Cu.) on local pain, and moderate doses of penetrating x-rays (125 to 150 r; 200 Kv. 1 mm. Cu.) on the vagus plexus, and on the para-vertebral sympathetic ganglions, in connection with the painful region, twice a week.
4. In essential neuralgia we irradiate roots with moderate doses (150 r) using penetrating x-rays (200 Kv.; 1 mm. Cu.) and, if necessary, we irradiate moderately (125 r) the vasculo-nervous cross-roads, and also the painful point, with semi-penetrating x-rays (140 Kv.; 0.5 Cu.).

CONCLUSIONS

Roentgentherapy is an effective treatment of pain, with a scientific basis. Furthermore, it is an inoffensive therapeutic procedure and quite often, it gives permanent results.

Roentgentherapy should be used much more often for the relief of suffering patients and for the credit of the physician who suggests a beneficent treatment as well as for that of the radiologist who gives it. If the radiologist were consulted by the physicians in many cases of pain, they could be of great help. It is desirable that radiologists and physicians co-operate in the treatment of refractory pains, as they do in many other fields.

RÉSUMÉ

Après une revue de la nature de la douleur et de ses voies de conduction nerveuse, l'auteur reconnaît aux rayons-X deux modes généraux d'action contre la douleur. Le premier, dont l'irradiation de la chaine para-vertébrale donne l'exemple, est l'inhibition ou la paralysie des filets nerveux eux-mêmes; il s'applique surtout aux formes de douleur dont le sympathique est conducteur. Le second mode d'action de la radiothérapie repose sur une influence indirecte ou humorale. D'après la théorie de Gilbert, les cellules détruites libèrent le tri-phosphate d'adénosine, doué de fortes propriétés vaso-dilatatrices. Par ailleurs, les rayons-X peuvent, bien entendu, soulager la douleur en détruisant des tissus inflammatoires ou tumoraux qui compriment des nerfs. La radiothérapie de la maladie de Hodgkin est un exemple de ce dernier mode d'action. Quel que soit le mécanisme de leur action, les rayons-X peuvent donner des résultats dans les cas de névralgies dites essentielles, du trijumeau par exemple, et dans toutes espèces de douleurs réfractaires. L'article se termine par des indications techniques pour la gouverne du radiothérapeute.

PAUL DE BELLEFEUILLE

NITRATE POISONING FROM WELL-WATER

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RECENTLY Goluboff[1] has drawn attention to methæmoglobinæmia in infants secondary to the ingestion of milk concentrates diluted with well-water having a high nitrate content. In this communication we record the first fatal cases in Canada attributed to the condition.

CASE 1

We are indebted to M. E. McCann, public health nurse, for the following history: "Baby S. had a normal birth, weighing seven pounds, four and one-half ounces and left the hospital after seven days, weighing seven pounds, five ounces. When she died at five weeks and two days, she weighed approximately ten pounds. From the time she came home from the hospital, she was on Carnation formula on which she steadily gained. The baby was given also one ounce of orange juice to eleven ounces of water once a day. Cod liver oil had not yet been started. Not more than 2 or 3 times had the baby ever been given water alone.

"All water which went into the formula came from a farm well and was boiled and the bottles and nipples were also boiled. The baby always seemed hungry, drinking all her feedings, but since Mrs. S. had been told to feed the baby only four ounces at each feeding she was afraid to give the baby more. The baby rested or slept very little at night, but slept better during the day. She cried a great deal, apparently only for attention because as soon as she was picked up she would stop. She was apparently very full of life and 'really too bright for her age'.

"The baby died on September 2, 1948. The first sign of any abnormality appeared three days before, when she appeared dull, indifferent and quiet. This somewhat worried the parents so the local doctor was called. He changed the formula to two tsp. lactogen to four ounces water every three hours. From then the child seemed to pick up each day becoming more active until September 2, she was very lively and back to her normal self. At her noon feeding on that day, she took her formula well, finishing about twelve p.m. and fell asleep. Her grandmother was holding her. Suddenly the baby awoke screaming and screamed for twenty minutes, flexing her knees. At 12.30 p.m. her parents left for Regina, the baby now lying quiet and limp, not even whimpering. They had driven only ten miles when the baby stopped breathing. She had turned blue. They drove home and the doctor told them the child was dead. Only once, two weeks before, did the baby have any cyanotic symptoms. On this day the parents noticed that the baby's lips and throat were slightly blue.

"There was no diarrhœa or constipation. At all times the stools were normal."

The body was sent into Regina for post-mortem examination which was performed 9 hours after death.

POST-MORTEM EXAMINATION

External examination:

The body was that of a moderately well nourished female child, 56 cm. in length and 3,840 gm. in weight. The skin and mucous membranes appeared pale. The nail beds were deeply cyanosed.

Mouth and neck.—There was no obstruction of air passages and, apart from engorgement of neck veins, the structures were normal. The blood in the veins (and from all other sources) was seen to be a deep chocolate-brown colour and was also fluid, no clots being present.

Thorax.—The trachea and bronchi contained a slight excess of mucus. The pleural cavities contained a film of straw-coloured fluid. The lungs showed patchy areas of collapse and section revealed congestion and œdema. The pericardium was normal. The heart was enlarged due to dilatation of the auricles especially the right, otherwise it was normal.

Abdomen.—There was a slight excess of straw-coloured fluid in the peritoneal cavity. The liver, of normal size, appeared fatty. The spleen (19 gm.) was judged to be of upper normal size and showed a uniform dark blue pulp. The stomach was distended with a clear watery fluid admixed with clots of milk. No other abnormality was detected. The calvarium, brain and skeleton showed no abnormalities.

Laboratory examination:

1. Blood films: These were reasonably preserved. No abnormality was detected.

2. Blood for pigments: *44% of the hæmoglobin was found to be in the form of methæmoglobin.*

3. Bacteriology: Culture of lung transudate yielded no pathogens.

4. Histology: The liver, spleen and kidneys appeared normal. The lungs showed gross capillary congestion, small areas of collapse and œdema.

5. In view of the above findings, a sample of well-water from the source used to dilute the baby's feeds was analyzed. *A nitrate content of 1,320 p.p.m. was found.*

CASE 2

Baby B., a boy, was a normal full term delivery. As the mother developed fissures in her nipples, it was decided to put the baby on lactogen. The lactogen was diluted with water from a farm well. The water was always boiled before use. Dr. R. J. A. White, Arcola, gives the following history:

"At eight p.m. on August 23, 1948, Mrs. B. brought her baby, aged six weeks, in to see me. The history she gave was that about supper time the previous evening

the baby had a spell of respiratory difficulty and 'whiny' crying and did not look well. This apparently had passed off and the child seemed well until the evening of the visit when another attack occurred about six p.m. Instead of the baby getting better, he seemed to get worse, and she brought him in to see me. Physical examination showed a crying, cyanotic, sick infant. Heart and lungs were normal, temperature by rectum was 97, and the abdomen seemed somewhat distended. The child appeared moribund at that time. I made a tentative diagnosis of methæmoglobinæmia, and, as there was no methylene blue in Arcola suitable for intravenous injection, I advised them to rush the baby to Regina. At about 9.30 p.m. he expired on the way there.''

Post-mortem Examination

The examination was performed twenty-four hours after death in hot weather. The body had not been refrigerated and post-mortem autolysis rendered the examination difficult.

External appearance.—The body was that of a well nourished male infant, 58 cm. in length, and 5,000 gm. in weight. The nail beds were deeply cyanosed. The skin and mucous membranes appeared pale. There was a suspicion of a slight icteric tinge in the conjunctivæ.

Mouth and neck.—The great veins were distended with blood which appeared to be abnormally brown in colour, as did the blood from all other sources. There was little clotting of the blood.

Thorax.—The trachea, bronchi and pleuræ were normal. The lungs were semi-solid from congestion and œdema. The pericardium and heart showed no abnormality apart from distension of the auricles.

Abdomen.—The liver (74 gm.) and spleen (6 gm.) were a dark plum colour but otherwise normal. The alimentary tract was autolytic. No other abnormality was detected.

The calvarium, brain and skeleton showed nothing abnormal.

Laboratory Investigations

1. Blood smears: Smears were difficult to examine due to autolysis. Nevertheless conspicuous abnormality could be made out. The nucleated-cell proportion was obviously increased. This was due to the presence of numerous nucleated red cells and large cells consisting mainly of leptochromatic nucleus. It was not possible to identify these cells accurately. Since, however, there was no obvious increase of leucocytes or other myeloid cells or of lymphocytes, the cells were taken to be erythroblasts.

2. Blood for pigments: Standards and methods had not been fully developed for methæmoglobin determination at the time of examination. *The methæmoglobin content of the blood was found to be considerably higher than 25%.*

3. Bacteriology: Cultures of lung transudate yielded no pathogens.

4. Histology: The liver was abnormal. The sinusoids were dilated and the blood contained an abnormal proportion of nucleated cells. The proportion of nucleated cells was much greater than in the blood in the vessels of other organs. Many of the nucleated cells could be identified as belonging to the erythroblast series. Accordingly, erythroblastosis was present in the liver. The lungs showed gross congestion, œdema and areas of collapse. No conspicuous abnormality was found in the spleen or kidneys.

5. Well-water analysis: a sample of well-water from the source used to dilute the baby's feeds was analyzed. *A nitrate content of 1,219 p.p.m and a nitrite content of 12.6 p.p.m. was found.*

Discussion

Both infants died in the sixth week of life. In both the source of fluid was well-water and inspection has shown that the wells were contaminated by the run-off from surrounding soil heavily contaminated by cattle manure. In each case the nitrate content of the well-water was 600 times the upper recommended safe limit for nitrates of 20 p.p.m. Nitrates are believed to be reduced to nitrites by the bacterial flora of the infant's intestine and, if absorbed in sufficient concentration, alter the hæmoglobin to methæmoglobin. In Case 1 a concentration of hæmoglobin as methæmoglobin of 44% was found. In Case 2 the concentration was over 25% but the precise figure is not known. In both children cyanosis was noted in life, and death was associated with heart failure. The clinical and laboratory features are similar to cases investigated in life and accordingly we attribute the death to anoxæmia secondary to methæmoglobinæmia.

In Case 2 an unusual feature is the finding of erythroblastosis in the liver and erythroblastæmia. The latter feature has not previously been recorded in nitrate methæmoglobinæmia in infants though one of us has seen reticulocytosis and a few nucleated red cells in the blood of a soldier with methæmoglobinæmia believed secondary to swallowing antigas ointment. We consider that the infant had had subclinical methæmoglobinæmia for some

time and that the erythroblastæmia is a response of the erythron to anoxæmia similar to what is found in congenital heart disease. There may, of course, have been some unknown constitutional condition associated with this unusual finding.

Methæmoglobinæmia in infants secondary to a high nitrate content in well-water constitutes a curious problem in Southern Saskatchewan. Prior to 1948 no cases are known to have been identified and clinicians cannot recall cases which would fit into the picture. In addition to the two fatal cases recorded six, some severe, have been treated this year in the local hospitals successfully by, (1) oxygen inhalation; (2) injection of methylene blue; (3) added to the important measure of stopping the well-water.

At a clinical-pathological conference in Regina, the following factors were considered to bear on the question.

1. A condition is only identified where it is looked for and the medical press has only emphasized the condition recently.

2. Breast feeding is common in rural Saskatchewan but it is on the decline. With the decline of dairy farming even to the keeping of one cow, more artificially-fed infants are getting milk concentrates diluted with water. The latter is subject to much more dilution than cow's milk.

3. Medical services and hospital facilities with attendant laboratory facilities have increased lately with prosperity and enlightened social legislation.

4. With recent prosperity (since 1938) most farmers now own motor cars and can rapidly transport the sick for medical attention. With slower methods of transport, the cyanosis in methæmoglobinæmia might well have passed off before the child got to the doctor.

5. Nevertheless, since no cases were recorded in 1947 when medical services were much the same, it was felt that there must be some additional factor operating. This may be a climatic one producing greater contamination of wells; 1948 was exceptional with a dry spring and a short wet spell in summer. Cases of methæmoglobinæmia have been coming in from September to November.

6. It was also considered that since so many wells in the Province have a high nitrate content (see survey of wells) many more infants should be affected if the nitrate content was the only factor. Accordingly, it was considered that there was an (unknown) intrinsic factor determining the onset. Recently Cornblath and Hartmann[2] have shown that methæmoglobinæmia from ingestion of nitrates is only produced in infants with a low gastric acidity (pH higher than 4.0). This condition permits nitrate-reducing bacteria to flourish high in the alimentary tract and thus nitrite is produced before all the nitrate is absorbed. They show that the condition can be prevented by adding lactic acid to the milk formulæ to produce a final concentration of 0.5 to 1%. Nevertheless, they deem it safer to prohibit ingestion of nitrate water until infants are old enough to develop good gastric acidity (the gastric juice has a characteristic low acidity in the neonatal period). They also consider that the treatment of choice in severe cyanosis is intravenous methylene blue, 1.0 to 2.0 mgm. per kilogram.

SURVEY OF WELLS

A survey of the nitrate contents of rural well-waters of Saskatchewan was commenced in May, 1948. Every sample of water submitted for a sanitary opinion was also analyzed for nitrate and nitrite content. To date, approximately 2,500 such waters have been examined. The nitrate estimations have proved so valuable that they are now routinely carried out on all drinking waters submitted for a sanitary opinion.

The results are surprising. Nitrates are not regarded as a normal constituent of good drinking waters. Amounts in excess of 20 parts per million are regarded as potentially dangerous to infants. Of the rural wells in this province, dug and drilled, 25.5% were found to contain more than 20 parts per million; 16.1% contained more than 50.0 parts per million. The nitrite contents, on the other hand, were less than 1.0 parts per million in 99.7% of the wells. When nitrite contents over 1.0 parts per million were recorded, the nitrate contents were generally 100 times greater on the same sample. Dug or shallow wells accounted for 95% of the high nitrate waters; drilled wells were responsible for the remaining 5%.

There is little doubt that the principal source of nitrate content is bacterial decomposition of animal or human excreta that has found its way into the wells. The level of nitrate in the water corresponds very closely with the ease of entry

of such excreta into the well. Well protected wells were generally very low in nitrate content. Two deep drilled wells found with high nitrate content were proved contaminated from a subsurface sewage disposal bed. The sewage from the tile septic-disposal area found its way to the outside of the pipe casing and then followed the casing down to the bottom of the well. However, there were some new wells in virgin soil where the most probable source of nitrate content was from bacterial decomposition of humus in the soil.

The level of 20.0 parts per million designated as a safe upper limit is somewhat arbitrary. Of ten cases reported, the lowest nitrate content definitely responsible for methæmoglobinæmia was 300 parts per million. However, there was one mild case of suspected methæmoglobinæmia where the drinking water contained only 17.0 parts per million of nitrates. The infant concerned recovered in hospital before blood could be collected to demonstrate the presence of methæmoglobin.

It is expected that more complete details of the findings of this survey will be published elsewhere.

SUMMARY

Two fatal cases of methæmoglobinæmia in infants secondary to ingestion of well-water with a high nitrate content are described. Attention is drawn to the conditions of rural wells in Saskatchewan and to possible factors involved in the development of nitrate methæmoglobinæmia in infants.

The other cases of methæmoglobinæmia were under the care of Dr. Urban Gareau, chief of pædiatrics, and staff, and Dr. Marion Gilmour, clinical pathologist, Regina General Hospital.

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The Swedish apothecary Carl Scheele (1742-1786) was responsible for discovering many new chemical substances. The long list of these includes arsenic acid, hydrogen sulphide, arsenic sulphide, chlorine, hydrofluoric acid, and lactic, oxalic, citric, and tartaric acids. He also carried out an extensive investigation of the properties of manganese. He anticipated Priestley in the discovery of oxygen and came close to discovering the nature of combustion.—Trevor I. Williams, *Brit. Med. Bull.*, **5**: 1209, 1948.

STUDIES OF NUTRITION IN NEWFOUNDLAND CHILDREN*

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PART I.

THE following is a study of the diet of the Grenfell Mission Orphanage and the nutritional status of its children compared with the findings of a nutritional survey of St. Anthony, Newfoundland, and its outports.

This report of the diet of the children of the Grenfell Mission Orphanage at St. Anthony was made from actual observations in the institution over a ten-day period, by eating with the children, observing the food preparation in the kitchen, and studying the food purchase records of the Orphanage. It provides a surprisingly clear picture of the eating habits and dietary intakes of these children.

It was most gratifying to find so adequate a diet possible by the use of simple wholesome foods of high nutritional value, in a locality where food variety is necessarily limited. It was a pleasure to see the zest with which these children ate their meals, while in the United States, where these same wholesome foods are more readily available, we have the ever-present "feeding problem" where appetite is dulled by the excessive use of high carbohydrate foods and over-solicitous handling of children.

The recommendations suggested are minor in character, and are offered, not in a spirit of criticism, but with the hope that they will help to make an already valuable project of even greater value.

The evaluation of the diet served at the Orphanage at St. Anthony was based on the actual amounts of all foods issued to the

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This is a condensed report of a survey made by the senior author as a field work project in partial fulfillment of the requirements for a Master's Degree in Public Health Nutrition, Simmons College, Boston, and was carried out under the supervision of the Department of Maternal and Child Health, Harvard School of Public Health, at the request of Dr. Charles S. Curtis, Superintendent of the International Grenfell Association.

Orphanage for the year 1944-45. Table I shows the average available food supply per child per day.

Since there is a wide age spread in the enrollment at the Orphanage, and a correspondingly wide range in nutritional requirements according to age, the recommended dietary allowances as set up by the Food and Nutrition Board of the National Research Council were totalled for the number of children at each age level and for the ten adults served from the Orphanage supply of food (Table II). A comparison was made of actual food consumption at the Orphanage with the allowances recommended by the Food and Nutrition Board for the number of individuals at each age level. The Orphanage supply of food provided each nutrient in amounts well over those recommended except for vitamin A and ascorbic acid. These recommended allowances do not represent actual requirements but rather a tentative goal to insure an optimum intake of all nutritional essentials. Therefore, the vitamin A and ascorbic acid content of the diet, while below that of the recommended allowances, may still have been sufficient to meet minimum requirements.

Table III shows the amounts of each of the essential nutrients provided in the average daily diet of the Orphanage by various food groups.

TABLE I.

AVERAGE AVAILABLE FOOD SUPPLY PER CHILD PER DAY IN THE ORPHANAGE
(On an "As Purchased" Basis)

	Amount per person per day. Ounces		*Ounces*
Dried apricots	.22	Cheese	.34
Crackers	.23	Rice	.16
Oleomargarine	1.21	Fresh beef	.18
White flour	4.78	Lard	.27
Brown flour	.91	Rolled oats	.45
Dried peaches	.19	Lima beans	.27
Jello	.08	Pea beans	.46
Tinned tomatoes	.12	Dried apples	.18
Peanut butter	.22	Macaroni	.23
Cornstarch	.08	Green peas	.27
Lime juice	.04	Hard bread	.26
Potatoes	14.21	Salt pork	.27
Turnips	4.42	Custard powder	.02
Fresh veal	.06	Salad oil	.01
Fresh salmon	.40	Raisins	.11
Prunes	.37	Salt beef	.73
Onions	.80	Fresh pork	1.20
Eggs (egg)	.23	Bakeapples	.47
Sugar	2.37	Molasses	1.00
Split peas	.22	Cornmeal	.11
Fresh apples	.63	Corn syrup	.11
Fresh carrots	.43	Fresh mutton	.28
Fresh parsnips	.04	Figs	.06
Fresh beets	.35	Bacon	.03
Currants	.03	Brown sugar	.53
Cream of wheat	.01	Honey	.02
Ham	.02	Salt	.31
Cocoa	.10	Fresh cod	1.37
Fresh milk	35.00	Blueberries	.05
Dry codfish	.86	Farina	.34
Cabbage	2.50	Partridge berries	.17
Lettuce	.23	Rye flour	.22
Tinned salmon	.22	Cocoanut	.01
Partridgeberry jelly	.41	Kidney beans	.13
Tinned beef	.16	Spaghetti	.03
Pickles	.31		

TABLE II.

TOTAL RECOMMENDED DAILY ALLOWANCES FOR EACH OF THE ESSENTIAL NUTRIENTS FOR ALL CHILDREN IN THE ORPHANAGE, AS COMPARED TO TOTAL NUTRIENTS CONTAINED IN AVERAGE DAILY FOOD SUPPLY OF ORPHANAGE

Ages	*No. of Children*	*Calories*	*Protein gm.*	*Calcium gm.*	*Iron mgm.*	*Vitamin A I.U.*	*Thiamine mgm.*	*Ribo-flavin mgm.*	*Niacin mgm.*	*Ascorbic acid mgm.*
Under 1 year	1	1,130	40	1.0	6	1,500	0.4	0.6	4.0	30
1 to 3 years	2	2,400	80	2.0	14	4,000	1.2	1.8	12.0	70
4 to 6 years	5	8,000	250	5.0	40	12,500	4.0	6.0	40.0	250
7 to 9 years	14	28,000	840	14.0	140	49,000	14.0	21.0	140.0	840
10 to 12 years	16	40,000	1,120	19.2	192	72,000	19.2	28.8	192.0	1,200
Girls										
13 to 15 years	15	42,000	1,200	19.5	225	75,000	21.0	30.0	210.0	1,200
16 to 20 years	2	4,800	150	2.0	30	10,000	2.4	3.6	24.0	160
Boys										
13 to 15 years	4	12,800	340	5.6	60	20,000	6.4	9.6	64.0	360
16 to 20 years	2	7,600	200	2.8	30	12,000	4.0	6.0	40.0	200
Adults (staff)	10	25,000	600	8.0	120	50,000	15.0	22.0	150.0	700
Total recommended allowances for 1 day	71	171,730	4,820	79.1	857	306,000	87.6	129.4	876.0	5,010
Total nutrients in orphanage food supply for 1 average day (as purchased)*		226,525	6,767	110.9	1,309	274,912	156.7	208.5	1,083.6	3,706

*Minus 10% to allow for waste.

Milk and cheese.—The most outstanding contribution to the diet was made by the average daily intake of 35 ounces of milk per child, this being the most important dietary source of protein, calcium, phosphorus, vitamin A and riboflavin, and second only to cereals as a source of calories and thiamine. The milk used at the Orphanage was undoubtedly of high nutritive value due to a special type of feeding of the cattle and it probably was high in ascorbic acid due to the fact that it was unpasteurized. It probably furnished approximately 20 mgm. of ascorbic acid per quart. In spite of this advantage of raw milk and although the milk at the Grenfell Mission was produced under the most careful supervision, general public health practice would call for its pasteurization.

Bread and cereals.—The bread and cereal group constituted the outstanding source of calories, iron, thiamine and niacin, and supplied approximately as much protein as the meat and fish group. Attention is called to the large proportion of essential nutrients supplied by the two food groups—"milk" and "bread and cereals"—the latter group supplementing the milk in the nutrients in which it is low; namely, iron and niacin. These two food groups combined furnished 44% of the day's calories, 58% of the protein, 80% of the calcium, 66% of the phosphorus, 39% of the iron, 57% of the thiamine, 77% of the riboflavin, and 60% of the niacin.

Meat and fish.—Meat and fish are important as sources of protein and niacin. Because fish constituted a large proportion of this group of foods, less iron was contributed than might be expected, since meat and eggs are normally the rich sources of iron in this group. Eggs were consumed in such negligible amounts, because of their unavailability, that they were not considered here. The average daily consumption of 1.2 ounces of fresh pork accounted for the high thiamine value of this group.

Dried beans and peas.—Dried beans and peas made a valuable supplement to the protein, iron, thiamine and riboflavin content of the diet.

Fruits and vegetables.—Potatoes, cabbage and turnips were used more abundantly than any other vegetable. The average daily consumption of approximately 14 ounces of potatoes was decreased in calculating the average daily food intake to allow for waste in peeling, and the ascorbic acid content of all three vegetables was calculated at values for cooked vegetables. These three vegetables constituted the most important sources of ascorbic acid. With sufficient amounts available for regular use throughout the year, and with proper preparation to preserve their ascorbic acid content, these vegetables, together with the raw milk already included in the Orphanage diet, would supply an adequate amount of ascorbic acid at all times.

There was an average consumption of 1.1 ounces of dried fruit and 1.3 ounces of fresh fruit per child per day, of which 0.6 ounce was made up of partridge berries and bakeapples. Bakeapples were found on analysis to contain 31 mgm. of ascorbic acid per 100 grams. Because native berries are consumed in the diet in relatively small amounts and at irregular intervals, they do not assume the importance of potatoes, turnips and cabbage as a source of ascorbic acid.

The only other nutrient in the diet below the recommended allowance of the National Research Council was vitamin A. This low intake could be offset by the regular use of carrots or some other deep yellow or dark green leafy vegetable, either fresh or canned, or by the

TABLE III.
AMOUNT OF EACH ESSENTIAL NUTRIENT PROVIDED PER CHILD PER DAY IN THE ORPHANAGE DIET, DIVIDED AS TO FOOD GROUPS

Food group	*Amount ounces*	*Calories*	*Protein gm.*	*Calcium gm.*	*Phosphorus gm.*	*Iron mgm.*	*Vitamin A I.U.*	*Ascorbic acid mgm.*	*Thiamine mgm.*	*Riboflavin mgm.*	*Niacin mgm.*
Milk and cheese	35.34	772	37.2	1.31	1.04	2.2	2,136	22	.49	2.04	.7
Bread and cereal	7.81	804	25.2	.09	.28	5.9	....	..	.91	.48	6.6
Meat, fish, egg	5.48	305	26.0	.03	.23	2.4	167	..	.40	.20	3.5
Dried beans, peas	1.35	125	8.5	.05	.18	3.7	8	..	.19	.16	.8
Fruits and vegetables	25.55	386	7.1	.17	.20	3.8	1,447	36	.42	.30	2.8
Fats, including peanut butter	2.01	684	1.9	....	.03	.2	514	..	.03	.02	1.4
Sugars, including molasses	4.44	469	....	.10	.02	2.4	....	..	.02	.06	1.2
Total*		3190	95.3	1.58	1.78	18.5	3,845	52	2.21	2.93	15.3

*All figures decreased by 10% to allow for waste.
In addition to the above, each child received one teaspoonful of cod liver oil daily, except in summer.

more routine use of cod liver oil, or by the increased enrichment of oleomargarine.

Sugars and fats.—Both of these food groups are important as sources of calories. The average daily consumption of one ounce of molasses per child was an important factor in supplying additional iron. It contributed at this level approximately 2 mgm. of iron, as well as 0.1 gm. of calcium daily. Oleomargarine, enriched at a level of 6,800 I.U. of vitamin A per pound, contributed about 500 I.U. at the average consumption of 1.2 ounces per child per day. It would seem advisable, as was contemplated by the Newfoundland Nutrition Council, further to enrich the vitamin A content of oleomargarine to take care of any possible shortage of vitamin A in the diet.

Cod liver oil.—In addition to the diet as given above, each child received one teaspoonful of cod liver oil per day during the winter and spring months. This supplied an adequate amount of vitamin D and increased the daily intake of vitamin A by about 9,000 I.U. It is recommended that the routine use of cod liver oil be continued through the summer months, especially in infants up to two years of age, to insure an adequate amount of vitamin D. Furthermore, the present dosage of cod liver oil continued throughout the entire year for all children and adults at the Orphanage would increase the vitamin A intake to an optimum level without any further change in the diet as consumed at present. The vitamin A content of this cod liver oil, which was produced and sold at St. Anthony, was found, by analysis, to be 2,340 I.U. per gram.

SUMMARY

From the foregoing analysis of the diet of the Orphanage and from observations made there, the following recommendations are suggested:

1. More valuable and economical use should be made of potatoes by serving them, except very occasionally, in the skins. With an intake of three medium potatoes per child per day, a conservative estimate on the basis of past consumption, this would furnish approximately 36 mgm. of ascorbic acid daily, which would supply at least one-half of the needed requirements at any age. By the present method of cooking only 12 mgm. or less of ascorbic acid are furnished from this same amount of potato. Improved cooking methods would also decrease the total amount of potato used daily, by decreasing waste in peeling, and so would effect an economy from a monetary standpoint as well.

2. The ascorbic acid value of the present consumption of cabbage and turnips would be greatly increased if they were served raw as cole slaw and turnip strips part of the time. When the vegetables are cooked, boiling water should be used and the cooking time held at a minimum. The ascorbic acid from these vegetables, together with that from the raw milk in the diet, would result in an optimum intake of ascorbic acid daily.

The above recommendations would entail close supervision of food preparation, but such measures would be justified in the resulting increase in ascorbic acid in the diet.

3. The increased use of fresh or "bottled" (canned) native berries served as fruit rather than jam is recommended in order to preserve their ascorbic acid content to the greatest possible extent. Rhubarb retains a considerable amount of its original ascorbic acid content even after cooking because of its acid medium. It is recommended that this fruit be served often when in season.

4. One teaspoonful of cod liver oil per day is advised throughout the summer months, especially in infants up to two years of age, to insure a sufficient amount of vitamin D. The routine use of cod liver oil throughout the year by all children and staff of the Orphanage is recommended also as the simplest and most economical means of offsetting any deficiency of vitamin A which may exist in the diet.

5. The increase of whole wheat flour to a level of one-half whole wheat and one-half white flour in bread making would make this food somewhat more valuable in protein and in the B-vitamins.

6. The substitution of a leaner type of meat for the salt beef now used is recommended. Foods excessively high in fat are generally not well tolerated by young children, and the use of a leaner meat is suggested as a factor in eliminating digestive disturbances, as well as in increasing the protein and certain other nutrients in the diet.

The diet of the Orphanage children is a striking example of what can be done with an adequate supply of simple wholesome foods native to the region; even more striking are the excellent appetites observed in these children who show a genuine enthusiasm for their meals, and whose appetites have not been destroyed by the high carbohydrate foods which have crept into our so-called modern civilization.

PART II.

Following the dietary study at the Orphanage, a nutritional survey was undertaken in St. Anthony and its outports in order to compare the food habits and average dietary intakes of these people with those of the Orphanage. This was done in the hope that the Orphanage could be used in an educational program to teach good food habits to the people in the area which it serves.

Scope of study and method of procedure.—This survey covered a period of three weeks' investigation, and was limited to the community of St. Anthony and to five outports located in small coves along the eastern coast of Newfoundland, all within a range of ten to twelve miles of St. Anthony. Nutritional histories were taken in the homes and represent the average food habits of 50 families, including more than 100 children.

Food supply of outport families.—The diet of the people in the outports is monotonous. Because of difficulties in transportation, imports are limited to the non-perishable types of food, and locally-produced vegetables are restricted to those maturing within the short summer season, chiefly potatoes, turnips and cabbage. A large number of the families have gardens which supply enough potatoes for the year, and turnips and cabbage until January or February. Turnip greens are used for a few weeks in the summer by all families having gardens. In each outport a few families own a cow or a goat. Some families keep two or three chickens, but in many cases even this small number of eggs obtained are sold rather than consumed by the family.

Food buying is usually done by the man of the family, and the year's supply of food is purchased in the fall from the merchant in the outport or from the local store in St. Anthony. Ordinarily the year's purchase includes dried beans and peas, salt beef, salt pork, white flour, "biscuits" (crackers), hard bread, rolled oats, oleomargarine, sugar, molasses, tea, and a small amount of canned milk. A few families purchase dried fruit—chiefly dried apples, with lesser amounts of raisins and prunes—rice, macaroni, and cheese. The extent of the buying, of course, depends largely on the economic status of the family, which, in turn, depends upon the success of the fishing season. Local food prices in general are high, and on many items the prices are prohibitive to the majority of these people.

Little fresh meat is used by the families, except for the very occasional slaughtering of a cow or a sheep and a limited amount of wild game in the winter. Fish, mostly cod, is used abundantly in the summer, and a goodly supply of fish is salted for winter use.

Food habits in the outports.—The similarity in meal patterns followed by these families was interesting. In one outport, for example, almost every family followed an identical meal pattern of "cooked dinner"—salt beef, potatoes, turnips or cabbage, and "peas pudding"—on Tuesday, Thursday and Sunday, with dried beans on Monday, fish and potatoes on Wednesday and Friday, and pea soup on Saturday. Bread, oleomargarine, jam or molasses, and tea accompany each dinner. "Tea", as the evening meal is termed, consisted of bread, oleomargarine, jam or molasses, and tea, with the addition of fish, when plentiful, or some food remaining from the noon meal. Breakfast usually consisted of bread, oleomargarine, jam or molasses, tea, and in many instances, rolled oats. "Molasses bread" between meals appeared on almost every nutritional history taken.

Comparison of the dietary pattern in St. Anthony with that in the outports.—While the same type of diet was consumed by the families of St. Anthony as by those in the outports, certain differences were obvious. There were more gardens, and more productive ones, in St. Anthony. Whole wheat flour was used in combination with white flour in bread-making, a practice which was not found in the outports except in one or two instances, and the "bottling" (canning) of fish, berries and other

TABLE IV.

TOTAL ESSENTIAL NUTRIENTS CONTAINED IN THE AVERAGE DAILY DIET OF THE POPULATION OF ST. ANTHONY AND ITS OUTPORTS, AS COMPARED TO TOTAL RECOMMENDED DAILY ALLOWANCES OF THE NATIONAL RESEARCH COUNCIL

Group	No. of cases	Calories	Protein		Calcium	Iron	Vitamin A	Ascorbic acid	Thiamine	Riboflavin	Niacin
			Animal gm.	Plant gm.	gm.	mgm.	I.U.	mgm.	mgm.	mgm.	mgm.
One year old	4	1,205	20.2	15.7	.59	7.0	1,638	15	.69	.92	5.2
Two year old	4	1,424	22.7	20.7	.61	10.9	1,559	14	.79	1.14	6.8
Three year old	5	1,689	20.3	28.4	.52	14.6	1,050	17	.96	1.09	8.3
Four year old	7	1,681	20.5	26.1	.43	10.8	826	9	.88	.95	9.4
Five year old	5	1,753	16.6	30.3	.36	14.0	679	11	.98	.85	10.5
Six year old	4	1,542	20.5	27.7	.26	11.6	601	8	.90	.74	11.9
Seven year old	2	1,082	41.6	26.6	1.02	12.0	2,230	11	1.13	1.91	11.7
Eight year old	3	2,025	22.5	38.7	.45	17.7	1,074	28	1.27	1.15	14.0
Nine year old	2	1,859	20.3	32.8	.51	17.1	779	13	1.07	1.03	11.3
Ten year old	1	1,985	21.0	38.4	.50	24.0	294	20	1.04	.88	13.8
Thirteen year old	1	1,038	5.7	24.7	.18	9.1	150	0	.72	.51	8.1
Adult women	10	2,222	24.9	37.4	.45	14.8	1,087	16	1.25	1.16	13.1
Pregnant women	2	1,968	17.4	38.7	.39	20.1	478	25	1.20	1.10	12.4
Total daily intakes of all group averages	50	86,797	1,083.4	1,482.0 (2,565.4)	23.62	669.3	51,140	662	50.25	48.80	496.2
Total recommended daily allowances for all groups		89,300	2,660.0		49.50	466.0	162,000	2,825	48.80	69.50	470.0
Per cent of recommended daily allowances furnished by the outport diet		97	97		48	143	32	25	102	70	105

locally-produced foods was done more extensively. Consequently, a more adequate and more varied winter diet was provided in St. Anthony.

Analysis of the outport diet.—Essential nutrients contained in all the outport diets studied were averaged for each age group and totalled for daily intake (Table IV). When compared to the recommended allowances set up by the National Research Council, protein and calories were only slightly below these standards. Of the total daily protein intake of all group averages, approximately 58% was supplied by plant protein, with bread the chief contributor, legumes and potatoes supplying less but still significant amounts. Animal protein supplied 42% of the total protein intake, with fish as the chief source.

In every age group, with the exception of one, the average daily calcium intake was extremely deficient. The figure for the total calcium intake of all group averages was only 48% of the recommended allowances. Most of the children, except in the few families where cows' milk or goats' milk was available, consumed only the amount of canned milk which was used in tea, usually two or three tablespoonfuls per day. Since there was no other important food source of calcium available, this average intake showed a very striking deficiency. Phosphorus intake was twice that of the calcium intake when averaged for all groups, but was still deficient since it averaged only 0.8 gram per person per day, against a desirable intake of one to two grams, depending on individual requirements.

The average daily intake of iron in outport families was higher than that recommended by the National Research Council. Enriched bread and molasses were the highest contributors to this nutrient, supplying 29 and 22%, respectively, of the total iron of all group averages. Without these two foods the iron intake of the diet would furnish only about 70% of the recommended allowance of the National Research Council. The flour enrichment program is responsible for the valuable contribution which bread makes to the iron content of the outport diet; this was not true previous to the institution of this program.

The vitamin A content of the average outport diet was strikingly low, the total daily average of all groups supplying only 32% of the recommended allowance. There is a short period of three or four weeks in the summer when the vitamin A intake is increased substantially by the use of turnip greens, but the low intake given here is probably representative of the remainder of the year.

Ascorbic acid, in a diet of this type, would be supplied chiefly by properly prepared potatoes, turnips and cabbage. Because of the inferior method of vegetable preparation, the average outport diet was extremely low in ascorbic acid. For the major portion of the year it furnished only approximately 25% of the recommended allowance of the National Research Council. Some ascorbic acid is contributed to the diets of those families using turnip greens, but for only a very short time during the year. Local berries in season, such as bakeapples, undoubtedly contribute some ascorbic acid to the outport diet, but this, again, is true for only a short season of the year.

The thiamine intake, when averaged for all age groups, was found to be adequate, due primarily to the extremely large amounts of bread eaten. This has been true only since the enrichment program has been in effect. Riboflavin was found to be very deficient in the outport diets, as would be expected since the milk intake is at such a low level. The daily intake of riboflavin for all group averages totalled 70% of the recommended allowance. Before the use of enriched flour this deficiency was even more marked. The niacin content of the diets was sufficient, bread supplying 46% of the total intake, and fish, 29%. Here again, without the use of enriched flour the diets would have been extremely low in this nutrient.

Very few children in the outports received cod liver oil. It appeared on the histories of several young infants but ordinarily was used only when children were ill.

It is obvious that the most marked deficiencies in the outport diet were in calcium, riboflavin, vitamin A and ascorbic acid. Total calories of all group averages closely approached the recommended allowances. However, the averages of individual age groups would indicate that some groups, especially the older children, had an inadequate caloric intake. In instances where calories were inadequate, protein needed for growth may have been burned for energy. Attention should also

be drawn to the fact that the total protein of all averages was only approximately equal to the recommended allowances and 58% of this total was plant protein. This suggests that in a considerable number of cases protein may have been burned for energy and that the assortment of amino acids in the diet may not have been such as to furnish the best possible for growth.

Comparison of the outport and the orphanage diets, with recommendations for the improvement of the outport diet.—In the diet served at the Orphanage calcium and riboflavin were supplied in large part by the 35 ounces of milk included in the average daily diet. While the inclusion of this amount of milk per child per day is not a practicable suggestion for the outports, increased consumption of milk in this group is imperative if their nutrition is to be improved to anywhere near an adequate level. This recommended increase in the amount of milk in the outport diet would not only raise the calcium, phosphorus and riboflavin levels but would also help to offset the deficiency in vitamin A and any possible shortages of protein and calories. It would also greatly improve the quality of the protein of the diet.

To effect such an increase in milk consumption in the outports, it would be necessary to make canned milk or dried milk available to these people at a price within their incomes, or to import goats into the country in sufficient numbers to supply the families with an adequate amount of milk. This program alone would be of little avail without a concurrent educational program to teach the benefits to health which would result from an increased use of milk in the diet, and to demonstrate ways of adapting this increased amount of milk to their already-established food habits.

One quart of milk per day in pregnancy and three to four cups per day, depending on age, from infancy through adolescence, should be set as an ultimate goal. Every effort should be made to increase the milk intake of the normal adult population, realizing, of course, that this change would be most difficult to effect. Although this goal would not be realized for many years, it should be set as an aim toward which to work.

To remedy the low vitamin A content of the outport diet, further enrichment of oleomargarine, as was contemplated by the Newfoundland Nutrition Council, is desirable, inasmuch as this food was being used by all families interviewed. It is further recommended that cod liver oil, which can be produced or purchased locally at a very low cost, be used more extensively. One teaspoonful of this cod liver oil per child per day would more than supply the vitamin A requirement at any age and would serve as a source of vitamin D as well. It is recommended that the use of cod liver oil be continued through the summer months as well as through the winter, especially in infants up to two years of age, to insure an adequate amount of vitamin D. Since the use of cod liver oil is a simple and economical way of providing the much-needed vitamin A in sufficient amounts, it is recommended that a program be developed to educate the entire population to the routine use throughout the year of locally-produced cod liver oil, as their most important food source of vitamin A, and to teach the benefits which would accrue to them from its use. The more widespread production of greens in sufficient quantity so that a supply could be "bottled" for winter use is urged as another means of offsetting the vitamin A deficiency of the diet. All of these recommendations would involve an educational program to interest the people not only in using locally-produced cod liver oil regularly, but to teach better methods of gardening and food preservation.

The recommendation for increasing the ascorbic acid content of the diets is primarily one of education. The chief sources of ascorbic acid in the outport diet, as is true in the Orphanage diet, are properly prepared potatoes, cabbage and turnips. Again an educational program is urged which would teach the outport families better gardening methods so that these vegetables could be produced in sufficient amounts to make them available throughout the year, as well as the best methods of preparing these vegetables to preserve their ascorbic acid content.

SUMMARY

In summary, any improvement made in the quality of the outport diets would seem to depend on the addition to the diet of some form of milk in sufficient amount to increase the intake of the essential nutrients contained in milk and so obviously lacking in the outport diets, and, especially in the case of the children,

the addition of cod liver oil used regularly throughout the year. With these two foods added, the remaining problem would be one of improving present gardening and cooking methods.

Inasmuch as all the materials required for improvement of the outport diet are available locally or could be made available, it is then a matter of the development of an educational program to teach the most advantageous use of the available foods and the importance of good nutrition to physical well-being. It would seem that the Grenfell Mission Orphanage at St. Anthony should be an integral part of any educational program attempted. It is in a unique position to serve as a demonstration centre for such a program. The Orphanage diet, with some modification in the amount of milk as already recommended for use by the outport families, would be an excellent example of a simple diet high in all essential nutrients, in which these nutrients are supplied by foods accessible to the families in the outports. The superior physical condition of the Orphanage children, as contrasted with the outport children whose diets are far less adequate, would also illustrate the results possible with a diet adequate in all the essential nutrients.

Some observations of the physical condition of the outport children.—At the time the nutritional histories were taken in the families of St. Anthony and its outports, certain observations were made of the physical condition of the children. Heights and weights of 60 children were recorded, and note was taken of the condition of the skin, eyes, teeth and gums. In the accompanying graphs average heights and weights of outport children and of the children at the Orphanage are compared with each other and with the anthropometric norms as published by Vickers and Stuart.*

* Vickers, Vernette S., and Stuart, Harold C., Anthropometry in the Pædiatrician's Office, Norms for Selected Body Measurements Based on Studies of Children of North European Stock, *J. Pædiat.*, **22**: 155, 1943.

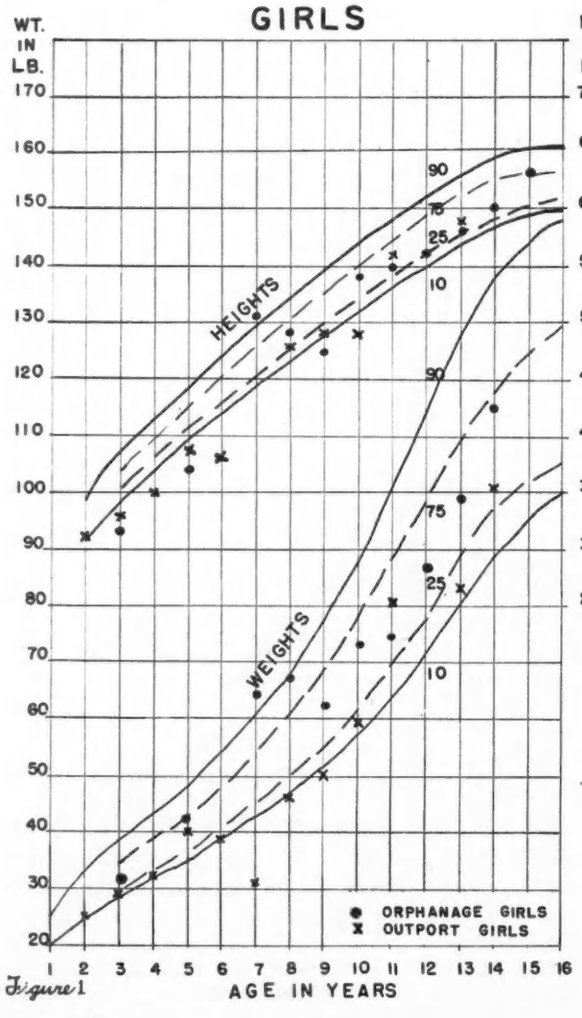

Figure 1

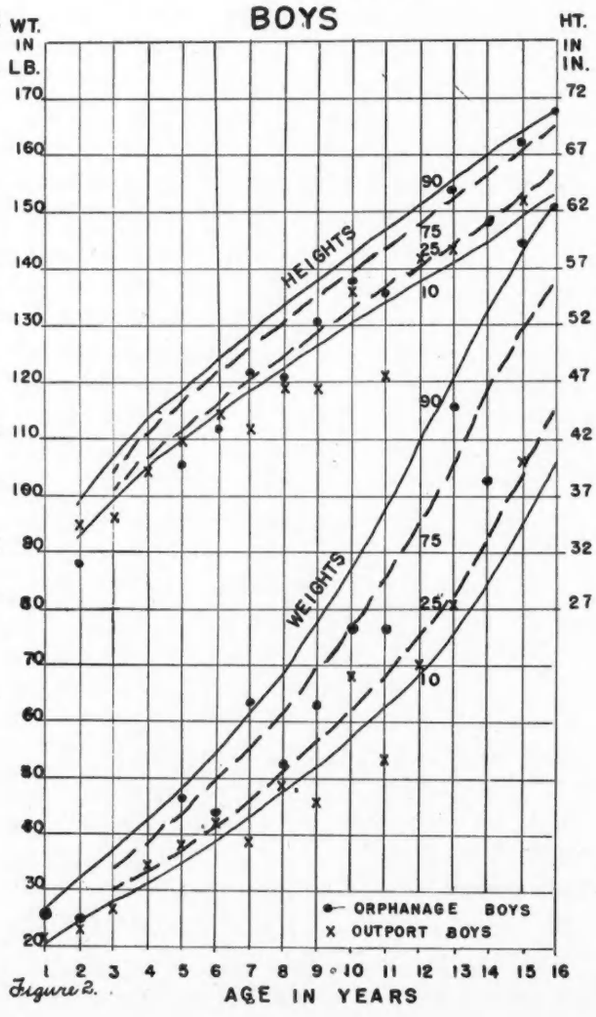

Figure 2.

Of the 60 children observed in the outports, 72% showed obvious tooth decay; in 47% almost all of the teeth were affected, showing extensive decay and discoloration. In sharp contrast were the beautiful teeth of the Orphanage children. In a dental report of examinations made on 73 Orphanage children, 63 required no treatment; in those children treated, all but three were extractions of temporary teeth. Dry skin was observed in 42% of the outport children. In 27% of the cases, angular lesions at the corners of the mouth with white macerated areas were seen. A few of the children showed inflamed eyelids and gave a history of chronic sore eyes.

While swollen and sore gums were not noted among the children, except in a few cases, this condition seemed to be prevalent among the women encountered, especially among the pregnant women and mothers of young infants. Of the limited number of women seen, practically all had lost their teeth or their teeth were markedly decayed. Most of the women appeared much older than their actual years.

About 20% of the children had histories of "wonderfully bad stomachs", constipation, nausea, frequent colds, or poor appetites, or a combination of several of these complaints. These conditions were not noted except on rare occasions on the medical records of the Orphanage children.

The above report of physical findings in the outport children is necessarily limited to such conditions as lend themselves to casual observation, and it is presented with a full realization of these limitations.

STREPTOMYCIN IN PULMONARY TUBERCULOSIS*

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FROM the work already completed on streptomycin, it is quite apparent that this drug does offer some degree of specificity in treatment. In discussing the use of streptomycin in pulmonary tuberculosis, we have attempted to base our conclusions on facts gathered from a review of cases actually under treatment in the Mountain Sanatorium. The present survey covers 176 of 300 cases started on treatment prior to July 15, 1948. The cases not reviewed were those in which the indication was non-pulmonary or the drug was used in conjunction with surgery.

Early in our use of streptomycin the drug was given by the nurses on each service. However, as more and more cases were added, it became impossible for the ward personnel to keep up with the work required and it became necessary to organize a special nursing team. These nurses then took on the responsibility of all the streptomycin care in the institution. Such an arrangement worked very satisfactorily and has been continued to date. Special drug forms were obtained and have facilitated to a great extent the keeping of records.

The selection of pulmonary disease for treatment was kept as much as possible to the early, exudative type. In any treatment of tuberculosis, the best result will be obtained in the case that has not progressed to destruction and irreversible change. Once the pathological lesion has reached the stage of caseation, the destructive process cannot be reversed and healing must occur by the slow process of fibrous replacement. However, pure types of lesions do not commonly exist, and many cases are combinations of exudative and proliferative disease. Part of this exudative disease will represent a reversible process and will, therefore, be amenable to treatment. From a radiological standpoint, it is not always possible to interpret accurately the pathological process present. Even the time element will not necessarily give the answer as some chronic indolent lesions have been shown to be exudative and reversible when the time factor and unchanging x-ray appearance implied fibrosis. Nevertheless, it was our attempt to treat cases in which the exudative type was predominant. Occasionally, on their own insistence, cases of typical fibroid or fibro-cavernous disease were treated but their number was very much in the minority. The extent of the disease varied from minimal to far advanced, the majority of the cases being in the latter group.

Guided by the early recommendations from the United States, the dosage at first was usually quite high. In many cases, the course

* Presented at the Laennec Society Meeting, October, 1948, Toronto.

started with 3 grams daily in divided doses every three hours. This amount was slowly reduced to perhaps 1 gram daily and the interval reduced to six hours. The full length of the course would be anywhere from 90 to 180 days, the termination frequently being dictated by the patient's purse. As more experience was gained and reports received, the dose was gradually reduced to ½ to 1 gram daily, given at intervals of twelve hours or twenty-four hours. The length of course was also decreased to 42 days or even less. During the past few months our initial course has been 1 gram for twenty-one days, followed by ½ gram for twenty-one days. Rarely a severe case would be started on 2 grams per day.

In tabulating the results of the survey the cases were each listed under the following headings: diagnosis, complications, exact starting and stopping dates of streptomycin, daily dosage, total dosage and the result interpreted radiologically. The films were all personally reviewed so that the interpretation would be uniform. They were divided into unimproved and improved. To be listed as improved the case had to show definite x-ray clearing with improvement more than expected from bed rest alone. This improvement could rarely be visualized after one month, frequently by two months, and usually by three months. Usually clearing continued for several months after the cessation of treatment.

As stated, the result of treatment was interpreted by the radiological change seen on reviewing the x-ray films. Clinically, the majority of cases were improved even when the x-ray films showed no such comparable change. Cough and sputum were decreased, definitely reducing the use of sedative drugs. The patient's sense of well-being was much improved, the whole change making the nursing care of the seriously ill case a much easier procedure.

The following tables tabulate the result obtained from a survey of our cases:

TABLE I.
EXTENT OF TUBERCULOSIS

	No. of cases
Minimal	9
Moderately advanced	55
Far advanced	112
Total	176

Sex: male 96 female 80

The majority of cases receiving streptomycin treatment were in the far advanced group. These cases were naturally the ones selected for specific therapy, if such were to be achieved by streptomycin treatment, as they required assistance in healing their disease much more urgently than any other group. There were very few minimals and these cases listed were not all treated because of the pulmonary lesion itself, but because of some other complication as well. The ratio of male to female cases under treatment was approximately equal.

TABLE II.
STREPTOMYCIN DOSAGE RESULTS

Total dosage	*Unimproved*	*Improved*
Under 60 gm	49	34
Over 60 gm	36	57

In analyzing the result, we have attempted to show the effects of total dosage of streptomycin received, as well as the effect from varying lengths of time in days under streptomycin influence. This table divides the cases into two groups, those receiving a dosage of 60 gm. or less, and those receiving over 60 gm. It is seen that the results of treatment in the latter group were much better than in the former group. Seven of these cases really had remarkably good results and were listed as excellent. The ratio of improved to unimproved is seen to be 57 to 36.

TABLE III.
STREPTOMYCIN DOSAGE RESULTS

Total dosage	*Unimproved*	*Improved*
42 gm. and under	42	25
90 gm. and over	26	38

This table lists the cases receiving the extremes of dosage, namely 42 gm. and under, and 90 gm. and over. These results are similar to those shown in Table II, the ratio of improved to unimproved being better in the group treated with high dosage. It is also apparent that the ratio of improvement was not better in the 90 gm. group on comparison with the whole group 60 gm. and over. This suggests that dosage need not be carried that high.

TABLE IV.

Days	*Unimproved*	*Improved*
42 and under	37	20
43 to 63	20	18
64 to 91	9	17
92 and over	19	36

This table lists the cases in groups according to the number of days of treatment. They did not always receive a set length of treatment. In the 42 day and under group, for example, some received 21 days or 31 days, etc. These figures show that the cases receiving 63 days' treatment or more had approximately a two to one chance for improvement. It is concluded from this table that the length of time a patient is under treatment is also important. In this institution we are now prescribing streptomycin in the majority of cases for a 60 day course instead of the previous 42 day course.

TABLE V.

DOSE—1 GM FIRST PART OF COURSE
½ GM. SECOND PART OF COURSE

Days	*Unimproved*	*Improved*
42 and under	22	13
43 to 63	10	11
64 to 91	1	4
92 and over	1	0

This table lists the cases that received one gram or more for the first part of their course and then were dropped to one-half a gram for the second part of their course. The number of cases in the over 60 day treatment courses is very small, but in our early use of streptomycin we tended to use larger doses. The ratio of improvement for the shorter course is again approximately the same as in Table IV.

TABLE VI.

DOSE—1 GM. OR OVER, DAILY, FOR ENTIRE COURSE

Days	*Unimproved*	*Improved*
42 and under	15	7
43 to 63	10	7
64 to 91	8	13
92 and over	18	36

This table lists the number of cases treated with one gram or over daily for the entire length of their course. The cases are again divided into groups according to the varying lengths of treatment. This again shows the definite advantage of the longer period of treatment with a ratio of approximately two to one showing improvement. On comparing this table with Table V, the half gram dosage for part of the course did not appear to have a detrimental effect on the ratio of improvement. For this reason, therefore, the usual course of treatment now drops the dosage to ½ gram daily during the latter half of the treatment course.

Bacterial resistance tests were done chiefly on the later groups of cases. Eleven cases were found to be resistant, the tests being carried out as high as 200 micrograms of streptomycin. On reviewing this group of 11 cases, 8 showed no improvement or were actually worse, 3 showed improvement. The earliest case of resistance was demonstrated after receiving 38½ grams of streptomycin, the test being done on the 58th day.

CONCLUSION

A study of 176 cases of pulmonary tuberculosis treated by streptomycin has been made. From the x-rays reviewed, the ideal type of case for treatment appears to be the exudative case where the disease is scattered, not heavily pneumonic nor grossly excavated. Such would be found in miliary disease and widely scattered bronchopneumonic disease. From our results to date, it would appear that the treatment course be at least 60 days and the daily dosage ½ to 1 gram.

CHRONIC INFECTION OF THE FEMALE PELVIS*

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ACUTE pelvic infection is as old as the human race, and in contradistinction to most pathological conditions, is probably becoming more prevalent. Admittedly, the incidence of puerperal and surgical infection has been reduced remarkably, but our old enemy, the gonococcus, still flourishes as of yore. However, the percentage of cases diagnosed as chronic infection has been very definitely reduced, largely through our treatment of the acute primary conditions.

Definition.—Chronic infection of the female pelvic organs cannot be accurately defined, because there is no line of demarcation between the acute and chronic condition. Here we will include all stages beyond the acute primary episode. Again, the pathology cannot always be definitely defined in any individual structure, as

* Delivered at the Meeting of the Canadian Association of Obstetricians and Gynæcologists, Niagara Falls, Ontario, June, 1948.

adjacent organs are nearly always associated in the process. The bacteriological factor is also very variable. In the present discussion, we will not include tuberculosis or endometriosis.

Bacteriology.—Many organisms may be responsible for the infection, such as the gonococcus, various strains of staphylococci and streptococci, the colon group, *B. tuberculosis* and many others. Definite isolation of the causative organism is usually impossible for many reasons: (1) Many conditions present a mixed cultural return. (2) Vaginal and intra-uterine smears are not absolutely reliable. (3) In many cases a culture is not obtainable except during a surgical approach.

For clinical and treatment purposes, all cases may be considered as belonging to one of two groups: (1) gonococcal infection; and (2) streptococcal and allied infections.

The gonococcus is essentially a surface or mucous membrane infection, introduced into the vaginal canal, and invading the healthy glandular structure associated with the urethra, vagina or cervix. It will also pass through a healthy non-puerperal endometrial cavity, and infect the Fallopian tubes or peritoneal cavity. Rarely, if ever, will the gonococcus invade connective tissue, and therefore it is not a factor in pelvic cellulitis.

The streptococcus, although implanted in the vagina, urethra or cervix, will not invade a healthy non-puerperal endometrium without mechanical aid, but tends to attack connective tissue and lymphatics through a primary lesion in the normal protective mucous membrane. Primary streptococcal salpingitis has been reported in children, but has never been definitely proved in the adult. This has an important bearing on treatment, because a gonococcal infection will become markedly attenuated or sterile in approximately three months; on the other hand, the streptococcus will remain virulent indefinitely, and can never be attacked surgically with any assurance of safety.

Methods or sources of infection.—Gonorrhœal infection, apart from childhood, is practically always the result of intercourse with an infected partner. It produces more tubal involvement and has a greater tendency to tubal localization from fimbrial occlusion than the streptococcus. Streptococcal infection is more varied in its initiation, being the result of cervical lacerations incident to an attempt at inducing an abortion, infection at the placental site following an abortion or full time parturition with a spread through the uterine wall as a parametritis and thrombophlebitis, or to the Fallopian tubes and pelvic peritoneum. A probable source of introduction may be during a surgical procedure such as uterine curettage, radium application, tubal inflation or the wearing of a stem pessary.

Types of pathology.—As a rule, no definite or isolated site of infection can be diagnosed. The usual finding is a combination of several associated and adjacent areas of involvement. As a working basis, the following types will be found very satisfactory:

1. *An infected cervix* with one or more of the following conditions: laceration, eversion, erosion or cystic degeneration, and a resulting cellulitis in the base of the broad ligaments. Here is a persistent source of re-infection, and no hope of improvement can be anticipated until it is eradicated.

2. *Parametritis and pelvic cellulitis.*—This is nearly always cervical or uterine in origin, and can best be described as a combination of cellulitis, lymphangitis and septic thrombophlebitis. The infecting organism is practically always streptococcal and rarely, if ever, gonorrhœal. The induration may extend laterally to the pelvic wall, anteriorly to the base of the bladder, posteriorly as a collar around the rectum, or the thrombophlebitis may actually result in an iliofemoral thrombosis. The result may be almost complete resolution with very little pelvic deformity; residual fibrosis in the base of the broad ligament and limitation of uterine motility; persistent thrombosis of the venous channels with residual small foci of infection; varicosities in the pampiniform plexus of veins or actual abscess formation between the layers of the broad ligaments.

3. *Moderate tubal involvement.*—A variety of pictures may result from initially mild attacks of salpingitis. Since the advent of antibiotic drugs we see more cases of salpingitis resolved with little tubal deformity, a patent lumen and retaining some degree of their normal function. More often the result is occlusion at the uterine or fimbrial end of the tube, with partial or complete destruction of the mucous membrane and replacement by fibrous connective tissue. Nodular areas of fibrosis and infiltration (salpingitis

nodosum) distinguished microscopically from adenomyosis are especially common.

4. *Gross tubo-ovarian pathology.*—The usual findings in such conditions are: (*a*) In the Fallopian tube a pyo- or hydro-salpinx, tubal occlusion at either extremity, adnexial prolapse into the pouch of Douglas, peri-tubal adhesions and permanent loss of function. (*b*) In the ovary sclerosing adhesions, prolapse, multiple cystic degeneration often associated with hæmorrhage or actual abscess formation.

5. *Tubo-ovarian infection associated with chronic pelvic peritonitis.*—It is difficult to visualize a salpingitis without some peritonitis resulting. When the infection has been very virulent or an injudicious treatment has actually spread the infection, any picture of pelvic destruction may be produced. We may add to those in No. 4, adherent retro-version of the uterus; a cul-de-sac full of adherent intestine omentum, adhesions either recent or well organized and foci of exudate retaining some of the original organisms augmented by colon bacilli from the adjacent intestinal tract. An abscess located in the pouch of Douglas with the walls formed by the body of the uterus, rectum, prolapsed recto-sigmoid, ileum and omentum may assume the most bizarre arrangement imaginable.

Symptoms and physical findings.—Little will be added concerning the signs and symptoms, as every one is familiar with the condition and realizes that no group of symptoms are specific. We may enumerate lower abdominal pain, backache, general malaise, fever, tachycardia, menorrhagia and frequent menstruation, dyspareunia, leucorrhœa, dysuria and rectal tenesmus. Examination will reveal an abdomen indicating infection in the lower portion and vaginal findings showing one or more of the pathological groups given above. Always do a rectal examination. The rectal finger will give a new appreciation of the pelvic contour and the extent of cellular induration. The white blood count will be very high with a marked increase in the polymorphonuclear ratio and sedimentation rate rapid.

Diagnosis.—Time and space will not permit a detailed discussion of the specific or differential diagnosis. They are basically elemental in any case. However, from the standpoint of prognosis and treatment, a diagnosis of the infecting organism is essential. Are we dealing with a gonorrhœal or streptococcal lesion? In my own experience the following points are considered helpful:

1. *A careful history,* especially of the initial infection. A story of venereal infection, an abortion or parturition associated with infection is usually conclusive. About 5% of post-partum infections may be gonorrhœal in origin. The onset soon after marriage, or a period of marital separation, is suggestive of gonorrhœa. A history of pelvic infection associated with femoral phlebitis or a "so-called cold" or bronchitis in the convalescence is very suggestive of uterine involvement, parametrial thrombo-phlebitis of streptococcal origin. Exacerbations of symptoms, apart from the menstrual period, are usually due to re-infection with the gonococcus.

2. *Physical findings.*—The pathological changes found in the pelvis are usually adequate to explain all the symptoms. This is in contradistinction to endometriosis where the reverse is usual. In tubo-ovarian disease the findings are more often bilateral, involve the adnexial area and not the base of the broad ligaments, the adjacent vaginal fornix tends to be depressed, the cul-de-sac is clear and the uterus intimately associated with the area of induration.

3. *Laboratory findings.* — Gonococcal smears and cultures, if positive, are of value, but if negative, have only a relative value. Intra-uterine cultures are difficult to obtain without contamination and therefore unreliable.

Treatment.—Three objectives must be kept in mind when outlining your treatment: (1) Alleviation of subjective symptoms as pain, menorrhagia and dyspareunia. (2) Elimination of objective signs such as leucorrhœa. (3) Restoration or preservation of function as ovulation, menstruation, and fertility. The first and third are, by far, the more important. Do not "rush in" and grasp at the second.

Three axioms must be presented: (1) Rest is essential: This applies to the body generally, but more so to the pelvic organs. The financial factor in physical rest can usually be arranged, but the more important question of sexual rest is especially difficult. Stress to the patient that every exacerbation of symptoms lessens the chance of physical and functional cure. (2) Time is essential: This must be appreciated both by the patient and the attendant. There is no "short-cut" in treatment and "miracles" do not happen even with the help of antibiotic therapy. A treatment discontinued means

failure. (3) The anchor of successful treatment is still the production of local hyperæmia, and leucocytosis. It is evident that the essential treatment of pelvic infection is conservative therapy.

We may discuss the treatment as follows,

1. *Relation of treatment in the acute stages.*—The results of treatment of the subacute and chronically infected pelvis have largely been pre-determined by the treatment afforded in the acute stage. Approximately only 10 to 15% of gonorrhœal infections will develop salpingitis with adequate initial treatment. Residual pathology from streptococcal infection compares very favourably. The incidence of pelvic abscess has decreased remarkably. This is largely due to the following factors: (*a*) Elimination of active local treatments in the acute phase as douching, irrigation and tampon application. (*b*) More attention to general health. (*c*) The exhibition and proper evaluation of the antibiotic drugs such as penicillin, streptomycin and the sulfa derivatives.

2. *General care.*—"Never treat the pelvis and forget the patient." No detail is necessary beyond mentioning attention to the organs of elimination, physical and mental rest, and adequate nutritional and fluid intake and the maintenance of a normal equilibrium in hæmatocritic, electrolytic, hydrogen ion and vitamin values.

3. *Palliative therapy.*—(*a*) Rest—as indicated previously. (*b*) Local heat—applied as vaginal douches, abdominal fomentations, or a heating cradle over the lower abdomen. This induces local hyperæmia, increases the leucocyte count and augments Nature's efforts to establish a local defense against the spread of infection. The continuation of any heat therapy must be modified according to the general or local response as indicated by a rise in body temperature or an increase in pain. (*c*) Elliot heat therapy. This requires the application of a vaginal hydrostatic bag, distended to be in contact with all the vaginal surface at a temperature of 115 to 120° F. The amount of manipulation and trauma entailed is not favoured in the presence of active infection. It is very effective in the resolution and absorption of a chronic exudate. (*d*) Short wave therapy. Here we have an ideal form of generating heat. No trauma or manipulation is entailed; hospitalization or bed rest is not essential, it is easily applied and a minimum of trained help is required. Subjective relief of symptoms is at once apparent and the objective signs of resolution are often remarkable. (*e*) Artificial heating chambers. Constant attendance by a physician and a trained attendant are imperative and the technical and hospital facilities are only attainable in a large clinic. Renal and cardiac disease or a low hæmatocritic level are definite contraindications. (*f*) Antibiotic therapy. Here we have a specific attack on the offending organisms which has given outstanding results. It can be used in association with any other form of therapy without interference. Undoubtedly its main field is in the treatment of the acute stage, but it is distinctly useful later on, although the results will not be so dramatic. The choice of drugs will depend on the organism suspected or proved to be present. Dosage must be controlled by evidence of toxicity and frequent estimations of the blood concentration produced. Renal damage is a real danger signal in sulfa-therapy and the urinary output and appearance of the crystallized drug in the urine should be appreciated.

Under careful and adequate conservative treatment we have found that about 85% of pelvic infections can be brought to a fairly satisfactory conclusion.

4. *Surgical treatment.*—With certain reservations, I do not consider surgery the treatment of pelvic infection. On the other hand, many of these patients will eventually require surgical interference, not to eradicate infection, but to rectify the results of infection. Let us consider the subject under three headings:

(*a*) *Indications for surgery.*—(1) Pelvic abscess, when not responding to conservative treatment in any stage of the disease. (2) Cervical infection: no permanent resolution of a chronic pelvic infection can be expected with a cervix the site of cystic degeneration, and sepsis acting as a constant source of re-infection. The choice of conization or surgical repair is one of individual preference. (3) Adherent retroversion of the uterus, with or without prolapse of the adnexia, causing symptoms. (4) Tubo-ovarian masses, discrete in outline, not responding to further conservative therapy and if possible, allowing some time for natural sterilization. (5) Adhesions causing pain or threatened signs of intestinal obstructions. (6) Selected cases of sterility.

(*b*) *Contraindications to surgery.* — (1) Never in the acute stages except to drain an

abscess. (2) Any evidence of active infection such as temperature, a high leucocyte count, a rapid sedimentation rate or an active thrombophlebitis. (3) Inadequate time to relatively assure natural sterilization. Always doubt the gonococcus and never trust the streptococcus.

(*c*) *Helpful suggestions in the surgery of the pelvic infection.*—(1) Do not attempt to drain an abscess through an appreciable layer of induration. It will either resolve or become more accessible to surgical approach. (2) It is easy to start enucleation of infected adnexæ, but often difficult to limit the extent of the dissection. (3) One cannot remove infected parametrial tissue. The condition is not surgical. (4) Do not promise anything in relation to the restoration of fertility. Plastic operations on grossly damaged tubes are useless and very problematic in any condition. The more complicated the surgical procedure, the less chance of success. (5) The extent of surgical removal must be individualized, depending on the disease present, age of the patient and the necessity of attempting to preserve ovulation, menstruation or fertility. Due consideration must be given to the wishes of the patient, but a symptomatic cure is more essential than a functional one. (6) Always attempt to leave the uterus in anteversion and any remaining ovarian tissue where it should not prolapse into the pouch of Douglas. (7) Pay particular attention to complete peritonealization of all denuded areas. Use may be made of the recto-sigmoid to cover such areas or even occlude the cul-de-sac. Avoid, if possible, any prolapse of small intestine into the true pelvis. (8) Give consideration to the pre- and/or postoperative use of antibiotic drugs in cases of infection or anti-coagulants when thrombophlebitis is present or anticipated.

John Dewey, "the most profound and understanding thinker on education that the world has yet known" (Ernest C. Moore), has said repeatedly that mankind so far has been ruled by things and by words, not by thought. Humanity has not been in possession of the conditions of secure and effective thinking. Unless we master things, we shall continue to be mastered by them; the magic that words cast upon things may, indeed, disguise our subjection or render us less dissatisfied with it, but, after all, science, not words, casts the only compelling spell upon things.—Wesley Bourne.

THE ROLE OF SURGERY IN DISEASE OF THE THYROID GLAND*

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WHEN I was invited to speak on this subject I assumed that the choice of title was made largely in the light of the action on the thyroid gland of some drugs developed in the past 6 years, particularly thiouracil and propylthiouracil. What we would like to know is, in what way and to what extent these drugs have changed the treatment of thyroid disease since their introduction.

Until early in the second decade of this century, surgery of the thyroid was poorly understood. About this time, as resident surgeon in a large general hospital, one of my duties, all too often, was to organize heroic efforts at resuscitation, in the hope of preventing the death of candidates for thyroidectomy, following their operation. During this decade a better understanding of the thyroid gland and its influence on the many functions of the human body became apparent. The development of equipment for measuring the basal metabolic rate of an individual, gave great impetus to further study in this field. The leadership of Crile and C. H. Mayo in improving surgical technique added much to the pioneer work of Kocher and others.

In 1922 Henry Plummer told us of the effect of giving iodine to people suffering from Graves' disease and this, more than any other single factor, brought surgery to the fore in the treatment of hyperthyroidism. It took our profession a long time to learn however, that the primary improvement from the use of iodine was not usually sustained and that during the early favourable response to iodine therapy, thyroidectomy should be carried out. During the next 19 years no great advance in the treatment of hyperthyroidism was made, other than in refinement of surgical technique and postoperative care, and a better understanding and application of anæsthesia in this field of surgery.

About 1942, thiouracil therapy was introduced and since then the safer drug propylthiouracil, which has made it possible to

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greatly improve the condition of the really sick hyperthyroid patient to a much greater extent than is possible by the use of iodine therapy alone. My limited time does not permit a profound discussion of the fascinating chapter of the development of these goitrogens, so I shall summarize only the important points as they impinge on the treatment of hyperthyroidism.

The administration of thiouracil or propylthiouracil causes a great change in the structure of the thyroid gland. Colloid with its iodine and thyroxin is drained from the gland and the epithelial cells increase in size and number, and the whole gland becomes more vascular. This phenomenon is thought to be due largely to the action of the thyroid stimulating hormone of the pituitary gland in its attempt to stimulate the thyroid to produce more thyroxin, while thiouracil or propylthiouracil effectively prevents its synthesis.

In hyperthyroidism during the gradual change in the thyroid gland, a definite clinical improvement takes place. The weight curve goes up and the pulse rate comes down and the whole appearance of the patient and his sense of well-being improves. Laboratory findings parallel the clinical response. The basal metabolic rate drops gradually about 1% per day on a dosage of 0.2 gm. thiouracil t.i.d. or on 50 mgm. of propylthiouracil q.i.d. There is a drop in the protein-bound iodine of the blood and the abnormal nitrogen, calcium, phosphorus and cholesterol balances gradually shift toward the normal.

While using these drugs one should always bear in mind the complications which may occur. One of the most to be feared is agranulocytosis with or without a general leucopenia. When this occurs penicillin therapy may be a life-saving agent. Other complications which have been seen are sore throat and fever, lymphadenitis, enlargement of the salivary glands and a generalized skin rash. Nausea and vomiting may occur and acute yellow atrophy of the liver has been reported. It is pleasing to report that propylthiouracil seems much less liable to produce these complications and for this reason may soon supersede thiouracil in this field.

It would appear that these drugs in a period of 4 to 9 weeks, depending on the degree of hyperthyroidism, are able to bring down the basal metabolic reading of most hyperthyroids close to normal, with a corresponding clinical improvement. The unfortunate factor, however, is that the goitre is not reduced in size and indeed may become even larger than before treatment. When treatment is discontinued a large percentage of these relapse into hyperthyroid states and some do so while under treatment. Another objection to prolonged treatment is the ever-present possibility of complications. The drug has no effect in destroying adenomas of the thyroid, so that the patient is not protected against pressure symptoms, malignancy and the disfigurement that accompanies so many nodular goitres.

Because of these curative limitations, the prevailing feeling in regard to the use of these drugs, is that they should be used in hyperthyroidism only and then chiefly as an agent in preparing the patient for surgical treatment. Theoretically it would appear that thiouracil or propylthiouracil should be used in the preparation of all hyperthyroid candidates for surgery, but the prolonged preoperative treatment required and to a lesser extent the possibility of complications, weigh heavily in favour of the known action and safety of Lugol's solution as a preoperative medication in the milder forms of hyperthyroidism.

Our practice has been to use thiouracil and in the last 18 months, propylthiouracil, in the severely toxic people only, particularly those suffering heavy cardiac damage and the drug has been a great help in preparing for surgery all iodine-fast hyperthyroid patients. Even when prepared by one of these drugs, Lugol's solution is given for 8 to 12 days immediately preceding operation and propylthiouracil is discontinued about 6 days before operation. It is found that the characteristic involutional changes, brought about by iodine, makes the gland more easily handled surgically, and it is felt that the added systemic effect of iodine improves the resistance of the patient to operation.

Iodine alone is used preoperatively in all the milder forms of hyperthyroidism, as well as in those goitres showing no characteristic manifestations of hyperthyroidism, found chiefly in the nodular group. From an economic point of view, particularly when hospital beds are in such short supply, we feel that this practice has much to commend it.

When hyperthyroid patients are properly prepared with the help of the drugs already mentioned, they fall pretty much into the same category as the non-toxic surgical goitre, and the results of surgical treatment depend then largely on what I like to call the "operative dose". This is made up of a number of factors, chief among which are the following:

(1) *Anæsthesia.*—With sound immediate preoperative medication, thyroid operations lend themselves very well indeed to local anæsthesia, and in the past we have found ourselves using local anæsthesia without supplementary inhalation anæsthesia in the very sick patient, particularly the elderly candidate with severe cardiac damage. We have been extending this field until of late we probably do at least half of our thyroid operations under local anæsthesia alone. We have the feeling that the patient coasts along through the operation more easily than when inhalation anæsthesia or analgesia is used with all the attendant strain that usually accompanies this procedure, even in the best of hands.

In the very nervous, apprehensive patient, often in the younger group, we feel that the strain and emotional reaction attendant on an operation under local anæsthesia, makes it advisable to add to the local anæsthesia very superficial inhalation anæsthesia, and the agent most commonly used is cyclopropane reinforced by a liberal supply of oxygen. We have been fortunate in having available well trained, experienced and co-operative anæsthetists, without which we would prefer local anæsthesis alone in all cases.

In hyperthyroid patients more than other surgical cases it is of paramount importance to maintain a clear airway. This of course can be done by introducing a tube into the trachea before beginning the operation, but this entails reasonably deep anæsthesia for introduction of the tube, also the added period of anæsthesia makes quite an addition to the operative dose, which we try to keep as small as possible. Perhaps the greatest disadvantage of intratracheal tube anæsthesia is the inability of the patient to speak when requested to do so, in order to test the integrity of the recurrent laryngeal nerves when thought advisable. The need for this is an added reason for using local anæsthesia alone, or when supplemented by inhalation anæsthesia the latter should be light enough to have the patient speak on request without any undue delay.

When using inhalation anæsthesia we ask our anæsthetist to use an intratracheal tube only when we anticipate unusual distortion of structures in the removal of a large adenomatous goitre.

(2) A reasonably short period of time to complete the operation. (3) Easy and accurate handling of tissues. (4) Bleeding should always be under control, all vessels are caught before cutting, resulting in minimal blood loss and hæmostasis must be complete before closing the wound. (5) Protection of the recurrent laryngeal nerves. (6) Due respect for the parathyroid bodies.

In postoperative care we stress early swallowing, sips of water at first, then glucose containing fluids so that as a rule no intravenous fluids are necessary, but these are given to maintain fluid balance should vomiting persist through the first postoperative day. Rarely indeed is blood transfusion needed. Early ambulation is routine, the patient sitting in a chair late in the afternoon of the day of operation. The patient leaves hospital about the 5th to the 7th postoperative day, with very few exceptions.

One of the most important points in the operation is the amount of thyroid tissue to be removed and what should be left for future use. We feel that in the diffuse toxic goitre it is important to do a reasonably radical resection, leaving only a small amount of tissue on each side of the trachea, immediately in front of the recurrent laryngeal nerves and the parathyroid bodies. It is of supreme importance to cure the patient of hyperthyroidism; this also lessens the liability of recurrent hyperthyroidism.

Ordinarily, following operation these patients develop a rather lower than normal basal metabolic rate, but when iodine administration ceases this reading soon comes up, due sometimes to compensatory thyroid hyperplasia, should too little thyroid tissue have been left at operation. Seldom does permanent hypothyroidism result and when it does it can readily be controlled by thyroid therapy, and tends to improve and is preferred to a persisting degree of hyperthyroidism.

In operating for adenomatous goitres a less radical operation is usually carried out. Never-

theless, it is a mistake to fail to remove even small nodules from what appears to be a normal lobe, when the obvious nodules have been removed from the other side. As a routine we resect both lobes including removal of the isthmus and pyramidal lobe when present and often we are rewarded on removing the anterior half of an apparently normal lobe, by finding small nodules which were neither visible nor palpable before. These if left behind are the goitres of tomorrow.

Carcinoma of the thyroid gland is almost always a complication of a nodular goitre and it is more prone to occur in the solitary type of adenoma. When a patient informs a physician that an old nodular goitre has taken on growth and perhaps feels a little harder, surgery should be carried out at once. It is a comforting sensation, when operating, to find the malignancy confined within the capsule of the adenoma, for these are the people that are usually cured, in contrast to so many who are past this stage and who months before may have consulted a physician not sufficiently alert.

Aberrant thyroid nodules are commonly malignant, usually of the papillary carcinomatous type. The feeling that they are metastatic nodules from a primary growth in the thyroid gland is well established and when present the thyroid lobe of the same side should be removed, often disclosing the primary site.

When one considers the permanence of nodular goitre, the high incidence of thyro-toxicosis, the lesser incidence of malignancy and the still less serious matter of distortion of structures, as well as the disfigurement entailed, one should hesitate in being too complacent and satisfied to let nature take its course. As is true of tumours in other parts of the body, surgical treatment is the only known cure for adenomatous goitre. I think the patient should be made acquainted with the facts of the situation and then after consultation with medical and surgical advisers, should be in a position to choose between surgery and the only alternative, "the wait and see" policy.

Certain complications of hyperthyroidism such as the thyrotoxic heart with auricular fibrillation and sometimes congestive heart failure, occur all too often. These are sometimes mentioned as reasons for medical rather than surgical treatment whereas they are really added reasons for thyroidectomy, the only known cure for the goitre, which is responsible for the cardiac damage.

Associated conditions such as organic heart disease either rheumatic or sclerotic are greatly helped by removal of the extra cardiac load caused by hyperthyroidism. It is indeed very gratifying to see how well these people do over the years following thyroidectomy, in contrast to their limited capacity for exercise while suffering from hyperthyroidism.

For a time it was hoped that the thiouracil type of drug might be the answer to hyperthyroidism, during pregnancy, but it has been found that these drugs penetrate the placental barrier and by preventing elaboration of thyroxin, excite the secretion of the thyroid-stimulating hormone of the pituitary gland, which causes marked hypertrophy of the thyroid gland of the fetus. It would seem then, that up to date, the modern practice of surgical treatment of the toxic goitre in pregnancy should be continued.

The lowered sugar tolerance of hyperthyroidism is well known but even when the glycosuria clears up following thyroidectomy the patient should be considered a potential diabetic. In true diabetes, removal of a toxic goitre usually raises the sugar tolerance, often making the care of these people somewhat easier.

There has been great interest in the past few years in research in the use of radio-active iodine in thyroid disease. It is too early to predict even the possibilities of this fascinating work.

Our mortality in thyroidectomies up to 1928 has already been reported. Since 1929 and up to May 1948 we have done 5,218 subtotal thyroidectomies, all patients suffering from toxic diffuse or toxic or non-toxic nodular goitres. In this group we have had 35 deaths, an operative mortality of 0.66%. The causes of death are as follows:

Thyroid crisis	10
Ventricular failure (from hyperthyroidism)	14
Pneumonia	4
Cerebral thrombosis	2
Pulmonary embolus	2
Liver failure	1
Shock and anoxæmia	1
Sudden death on table (cause at post mortem undetermined)	1
Total	35

From 1942 to 1945 there was a lapse in private practice of three years while away on active service. From October 1945 to May 1948 we did 689 successive subtotal thyroidectomies without a death. In all the latter group thiouracil or propylthiouracil was used preoperatively in all very sick patients.

It is shown above that of the 35 deaths between 1929 and 1942, 24 died from the effects of thyrotoxicosis and this can now be eliminated pretty well by the preoperative use of propylthiouracil. This leaves 11 deaths from other causes, mostly accidental in origin and these are the deaths one should now try to prevent in order to still further lower the mortality rate in the surgical care of goitre. Had penicillin been available some of the four deaths from pneumonia might have been prevented.

SUMMARY

The great value of thiouracil and propylthiouracil in preparing the severely toxic goitre for operation has been recorded. Indeed, this contribution means that thyroid surgery in toxic goitres has been pretty well changed to the surgery of non-toxic goitres.

The limitation of the curative effects of these drugs has been mentioned, together with the dangers and disadvantages of their prolonged use.

The need for careful attention to the various factors that make up the operative dose has been mentioned, if a low morbidity and mortality rate are to be obtained. The mortality rate should now be only a small fraction of what it formerly was, when postoperative hyperthyroid crises were by far the commonest cause of death.

The health missions of the World Health Organization in Austria, China, Ethiopia, Greece, Italy and Poland have been contributing in many ways to the control of tuberculosis. The contribution of WHO in the purely scientific field, if less spectacular, has been none the less important, and has included consideration of the standardization of BCG and tuberculin, and the formulation of principles governing streptomycin therapy.

THE APPLICATION OF NERVE BLOCK IN DIAGNOSIS AND THERAPY

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IT has been an inevitable result of the growth of anæsthesia in knowledge and technical achievement that the activities of the anæsthetist have ceased to be confined to the operating theatre, and that he has gradually come to the position of being a collaborator with, and at times a consultant to members of the medical profession working in other fields. It is natural that the anæsthetist, with his knowledge of regional anæsthesia, should come to occupy this position in relation to those derangements of function where interruption of nervous pathways may have a therapeutic value, or where such interruption may serve a useful purpose in diagnosis or prognosis. The anæsthetist who interests himself in the field of diagnostic and therapeutic nerve blocking will be in demand primarily for his facility in producing nerve blocks. Gradually, however, in view of the fact that he will have more experience of these patients than many of the colleagues who request his services, he finds himself in the position of being asked to interpret the results of his blocks, or to decide when nerve blocking may be expected to benefit the patient, and to what extent.

The use of nerve blocks in therapy proves to be an intensely interesting study, since in many instances the reasons for success with this therapy are still obscure, and through observation of the results of the blocking of somatic and autonomic nervous pathways we are gradually coming to recognize the widespread disturbances which may be set up by local and sometimes very minor causative factors.

The successful practice of regional anæsthesia must be based on a detailed knowledge of the distribution of the peripheral nervous system, an accurate knowledge of the anatomical relationship of particular elements of both the somatic and autonomic nervous system at those points in their course where they are available for blocking, and the ability to visualize the anatomy of these regions in three dimensions. To this we must add the necessity for continued practice in the technique of nerve blocking, first in the cadaver, and then in the patient. Segmental distribution of

nerve roots must be kept constantly in mind (Figs. 1a, 1b and 1c).

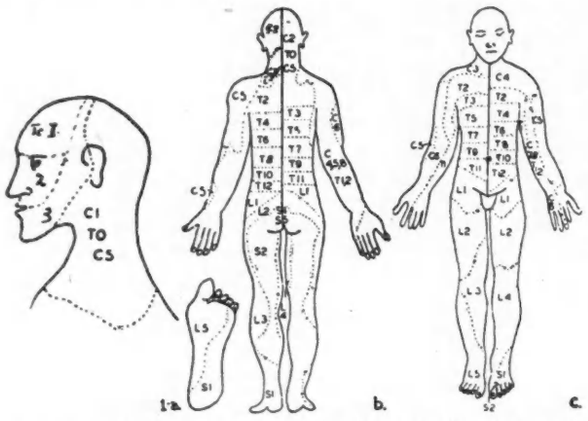

Fig. 1a.—Cutaneous distribution of the nerves in the head and neck. **Fig. 1b.**—Segmental distribution of nerve roots posterior aspect of the body. **Fig. 1c.**—Segmental distribution of nerve roots anterior aspect of the body.

Patients who may be benefited by the blocking of nerves for purposes of therapy, or in whom nerve blocking may assist in diagnosis, may be classified into several groups. There is a definite overlap between those blocks performed for diagnosis and those done for therapeutic effect, in that temporary relief or improvement only, obtained where a more permanent result was anticipated, sometimes establishes that surgical intervention of a definite type will be likely to effect permanent cure or improvement. Likewise, failure to produce significant changes may point out the hopelessness of surgical intervention aimed at permanent interruption of nervous pathways, or may localize a source of disturbance in the central nervous system rather than the periphery.

In general we may say that those patients in whom nerve block therapy may be of value are those suffering from certain pain syndromes, autonomic reflex dystrophies, and peripheral vascular disturbances. It is sometimes difficult, however, to decide to which classification a given syndrome or disturbance should be assigned. For instance, causalgia or Sudek's syndrome are certainly pain syndromes, but pain is only one of several factors, and the underlying mechanism requires that these be classed as autonomic reflex dystrophies.

CLASSIFICATION (TABLE I)

1. *Pain syndromes* (Table II).—The group of patients presenting with what I have classified here as "pain syndromes" is, on the whole, a most satisfactory group to treat. Those who suffer from constant minor pain, as well as those complaining of the more severe painful states, frequently become completely dominated by the pain, and are intensely grateful for relief. Further, in most of these, relief or substantial improvement may be provided through nerve block therapy.

The sub-group classified as "root neuralgia" is a very diversified one. I have included in this group all those patients who present a syndrome characterized by segmental pain associated with superficial hyperæsthesia. In this group you will find many old friends with familiar and time-worn labels. Amongst them

TABLE I.
THERAPEUTIC NERVE BLOCKS, GENERAL CLASSIFICATION

1. Pain syndromes	*2. Reflex dystrophies*	*3. Vascular disturbances*
1. Root neuralgia —idiopathic —posture —post-traumatic —postoperative	1. Post-traumatic and postoperative	1. Embolism —peripheral —pulmonary —cerebral —coronary (?)
2. Tic douloureux	2. Causalgia	2. Peripheral vascular disease
3. Intractable pain with malignancy	3. Shoulder-hand syndrome	3. Thrombophlebitis —acute —recurrent
4. Herpes —acute —post herpetic neuralgia	4. Phantom sensations —phantom pain	4. Post-phlebitic —œdema —pain
5. Visceral pain	5. Sudek's syndrome	5. Angina pectoris
6. Autonomic faciocephalgia	6. Volkman's ischæmic contracture	
	7. Frozen shoulder	
	8. Visceral —reflex anuria —reflex ileus	
	9. Keloid	

are patients who have suffered from "idiopathic pleurisy" and "chronic appendicitis". Other terms which will be familiar to you are "root neuritis", "genito-femoral causalgia", "fibrositis", "acute torticollis", "lumbago". In many of these patients one may find a causative factor in posture or some minor anatomical defect, or some small "trigger zone" in the periphery of the segment. In others no such cause is discernible, and yet these patients respond well to block therapy. Too often, unfortunately, these patients have been labelled "neurotic" because the physician has failed to find any anatomical defect. I am in full agreement with Dogliotti, who has said, "If the patient complains of pain, it is false conceit on the part of the physician to insist that . . . he has no pain". A patient was judged neurotic because she complained of pain and shortening of one leg. Two typical cases were operating room nurses. One had been off duty many times over a period of seven months with complaint of pain in the back and in the front of the right leg. She had an associated œdema of the front of the leg, and had been investigated for fracture. She presented with spasm of the spinal muscles on the right side, opposite the fourth lumbar spine, with hyperæsthesia of the whole of the distribution of the fourth lumbar root. There was 3/8 inch shortening of the right leg as measured by a levelling pelvimeter, and a tender nodule in the peri-spinal area opposite L4 on the right side. On two occasions the tender nodule was infiltrated and the 4th lumbar root on the right side was blocked with procaine. The right heel was lifted 3/8 inch. There has been no recurrence for over two years.

TABLE II.
PAIN SYNDROMES

Group	*Number*	*Complete relief*	*Improved*	*Not improved*	*Local anæsthetic only*	*Amm. chloride*	*Alcohols*	*Treatment discontinued Psychological*	*Reactions*	*Referred for other treatment*
1. Root neuralgia —idiopathic.....	16	13	1	2	3	12	1	1	nil	nil
—postural.....	10	5	3	2	2	7	2	2	nil	1
—post-traumatic.	9	6	2	1	7	2	0	0	0	2
—postoperative...	6	1	5	0	2	1	3	1	0	2
2. Tic-douloureux...	12	9	1	2	0	3	9	0	0	2 not treated 1. Lst. divs. 1. technical
3. Intractable pain from malignancy.	15	9	5	1 relief transient	0	8	8	0	0	1 diff. scarring from 2 prev. alcohol blocks
4. Herpes —acute.....	6	6	..	0	4	0	2	0	0	0
—post herpetic neuralgia.....	9	4	2	3	5	0	4	3	1	0
5. Visceral pain.....	5	5	..	..	4	..	1	..	..	4
6. Autonomic facio-cephalgia.....	6	2 permanent 4 transient	0	0	5	..	1	..	..	4 4

tingling in her left arm and hand, the left side of her neck, and the upper part of her left breast. The whole pain complex was reproduced by moderate pressure over the spastic scalenus anterior muscle, and the infiltration of 2 c.c. of procaine solution into the lower part of this muscle on two occasions relieved her complaint. She had no recurrence up to six months later.

Posture may play an important part in the development of segmental neuralgias, especially those associated with the segments T12, L1 and L4 and 5. This is probably associated with the fact that these portions of the weight-bearing spinal column are situated where the mobile column articulates with the more rigid thoracic and sacral segments. Segmental pain in these areas, usually worse after walking or standing, is frequently associated with some degree of

The history of the other patient mentioned is similar, but extended over two years. For two months she had been wearing an orthopædic brace without relief. There was 5/8 inch shortening of the leg. Following somatic root block on one occasion and lifting the heel 5/8 inch, she has been free of pain for eighteen months and has not worn her brace in that time.

Post-traumatic and postoperative segmental pain is usually related to scar tissue in the segment. Frequently these may be improved or cured by repeated pressure infiltration of the tender scars with dilute local anæsthetic solutions, associated with temporary block of the nerve roots in the segments involved. Where such treatment fails to give permanent relief, the appropriate nerve roots may be destroyed with alcohol, providing no necessary motor function is thus destroyed.

In the treatment of tic douloureux by nerve block, I feel that we gain the advantage of being able to destroy single branches or divisions of the trigeminal nerve, while preserving sensation in the other divisions. Usually this is all that is required. Where the first division is the site of the pain, one must block the Gasserian ganglion, and if one is forced to use alcohol in this location. I feel that surgical section is preferable, since the motor root will usually be preserved. However, if an alcohol block of the second or third division, either one or both, will suffice to control the pain, I feel strongly that this treatment should be employed, since one can then be certain that the sensation of the cornea will not be impaired; the patient obtains immediate relief without the necessity of hospitalization, and if necessary, operation at a later date will be no more difficult than before the alcohol blocks were done, since there is no interference in the operative site.

Intractable pain associated with malignant new growths, presents one of the most difficult problems in this field. The present alternatives to relief from appropriate nerve block therapy are ever-increasing doses of narcotics, pain tract section, and probably pre-frontal leucotomy. Unfortunately the source of pain in many cases is so located that destruction of the appropriate nerve roots will result in incontinence of bladder and bowel. I have achieved varying success in the relief of this type of pain by the intra-spinal use of a buffered ammonium chloride solution (as recommended by Bates and Judovich of Philadelphia), in some cases with relief of pain and no disturbance of other sensation. Of course, where destruction of sensory nerves with alcohol is practical, this is a most satisfactory method of treatment in these patients, and relief usually outlasts life.

The pain of herpes zoster may usually be permanently abolished by one or two procaine blocks of the affected segments, or of the sympathetic nerve supply of these segments. It is an interesting fact too, that in segments thus blocked the lesions dry up very quickly. Postherpetic neuralgia may in most cases be completely relieved by repeated blocking of the sympathetic nerves of the segment with a local anæsthetic solution, although an occasional case is refractory to this type of treatment.

Visceral pain may be abolished by blocking of the sympathetic ganglia at a suitable level. Examples of such are the pain of biliary or ureteral colic, pain from the kidney, the fundus of the bladder or the body of the uterus (including the pain of the first stage of labour and the pain of acute pancreatitis). The decision for the use of a transient or a more prolonged type of nerve block, *i.e.*, procaine or alcohol or bromsalizol, will, of course, depend on the cause of the pain. It is interesting to note in passing that a block of the splanchnic nerves on the appropriate side will permit a calculus to pass more readily down the ureter, through removal of the reflex inhibitory mechanism.

TABLE III.
REFLEX DYSTROPHIES

Group	*Number*	*Complete relief*	*Improved*	*Not improved*	*Local anæsthetic only*	*Treatment discontinued* *Alcohols*	*Psychological reasons*	*Reactions*	*Referred for other treatment*
1. Post-traumatic and postoperative	48	34	14	1	34	14	2	1	6
2. Causalgia	7	4	3	0	4	3	0	0	3
3. Shoulder-hand syndrome	3	3	..	..	3	..	..	..	0
4. "Phantom" pain	5	2	1	2	5	..	2	..	2
5. Frozen shoulder	1	..	1	..	1	..	..	..	..
6. Visceral—									
—reflex anuria	3	3	..	..	3	..	..	..	..
—reflex ileus	5	4	..	1*	5	..	..	..	..

*Cardiac failure, moribund before treatment—died shortly after.

Autonomic-facio-cephalgia is a term used to describe a paroxysmal type of pain which affects the face and scalp of one side, that is, it is not limited to the distribution of any one somatic nerve. This type of pain may arise spontaneously, or it may follow infection of a paranasal sinus, or trauma. I have seen two cases associated with diffuse fibromata in the sub-occipital region. The pain is immediately relieved by blocking the stellate ganglion of the same side, or by infiltration of the trigger zone, if such can be located. Many of these patients may be permanently relieved by repeated or prolonged block of this type, others will require ganglionectomy.

2. *Reflex dystrophies* (Table III).—The term "reflex dystrophy" is applied to a wide range of disturbances, usually resulting from trauma in the segments involved, and maintained by an autonomic reflex mechanism. They are characterized by vascular and nutritional changes in

the part, and usually associated with pain. From this it will be obvious that these dystrophies have much in common with the pain syndromes just described, on the one hand, and with certain of the vascular disturbances to be described later.

Reflex dystrophies are most frequently seen in the extremities. They may occur following accidental trauma of every kind, or after operation. Obviously all of the sub-headings under reflex dystrophies in this table are postoperative or post-traumatic except the shoulder-hand syndrome and the visceral reflex phenomena.

The common clinical picture of a post-traumatic or postoperative reflex dystrophy in an extremity is this; the foot or hand is cold, cyanosed, œdematous and stiff; there is usually excessive perspiration in the part; the skin is atrophic and shiny; there is complaint of pain and some hyperæsthesia.

In most of these patients complete relief may be provided by repeated interruption of the sympathetic pathways to the extremity. The immediate change is striking. The hand or foot becomes pink and warm, pain and hyperæsthesia are abolished, the extremity seems more normal to the patient, and range of movement is immediately increased.

Causalgia is a more severe edition of the type of dystrophy just described. Œdema and cyanosis may be less prominent, and the dominating factor is a burning pain and extreme hyperæsthesia. The significant injury in this instance is usually to a nerve trunk. I feel that we would be in error in limiting the diagnosis of causalgia to that extreme syndrome described by Weir Mitchell. These patients are usually provided with immediate relief of hyperæsthesia by appropriate sympathetic blocks. In the major cases such relief may be transient, and it is probable that in these complete relief should be given quickly by surgical sympathectomy. In less severe causalgia one may frequently provide lasting relief by repeated sympathetic blocks, using local anæsthetic solution, or by prolonged block with bromsalizol or perhaps ethyl alcohol. Causalgia must be treated early, before major disturbances occur.

Following amputation the patient may suffer unpleasant or painful phantom sensations. The pain or uncomfortable component of this sensation can in almost every instance be abolished by repeated blocking of the regional sympathetics with procaine. Usually the phantom will persist, but if it is not painful, few patients mind this.

Sudek's syndrome is a reflex dystrophy following fractures, characterized by pain and atrophy or decalcification of bone. This process may be interrupted and reversed by repeated blocking of sympathetic pathways.

Volkman's "ischæmic" paralysis (or contracture) is due to a profound reflex vasoconstriction following injury, with ischæmic necrosis of muscle tissue. The death of muscle may be prevented and function restored by early blocking of the sympathetic, in order to relieve the widespread vasospasm.

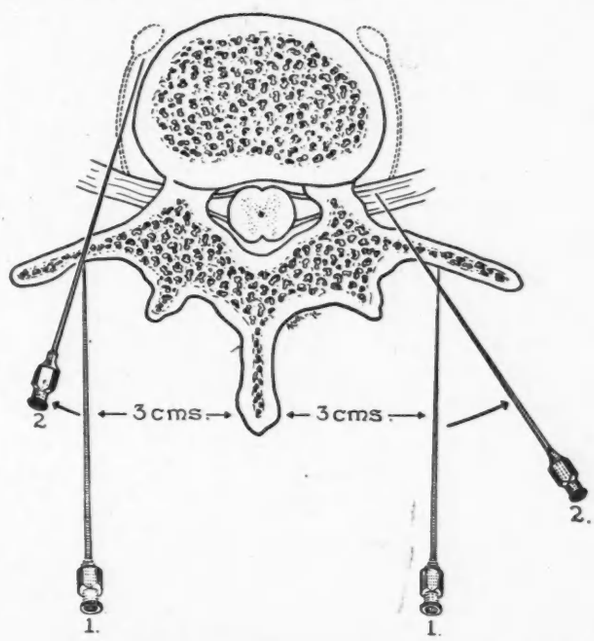

Fig. 2.—Diagrammatic representation of vertebral body, nerve roots, sympathetic ganglia and connections between the nerve roots and sympathetic ganglion in a typical vertebra in the thoraco-lumbar region. Right side—two positions of the needle in the technique of blocking the somatic nerve root. Left—two positions of needle in technique of blocking a lumbar sympathetic ganglion in the sympathetic chain in the thoraco-lumbar region.

"Frozen shoulder" sometimes follows injuries or fracture about the shoulder, sometimes is associated with subdeltoid bursitis and the laying-down of calcium in the walls of the bursa, and in some cases occurs without either of these factors in association. Occasionally the hand is also swollen, cyanosed and cold—the so-called shoulder-hand syndrome. In the early course of this syndrome, blocking of the stellate ganglion of the same side will produce

relief, the block being repeated until there is no recurrence of the pain. Block of the transverse scapular nerve will be effective in relieving the pain in the shoulder joint, if this should be required to establish a good range of movement. Late cases will require to have adhesions in the capsule of the shoulder joint broken down under brachial plexus anæsthesia, and those having deposits of calcium in the subdeltoid bursa or capsule of the shoulder joint, will require operation.

Reflex anuria and ileus may be promptly relieved by blocking the splanchnic nerves by the posterior approach. The technique for this block is essentially similar to that for sympathetic block at L1, but the needle is entered at a greater distance from the mid-line, so that it comes to lie tangentially, nearer to the anterior surface of the vertebral body (Fig. 2).

TABLE IV.
VASCULAR DISTURBANCES

Group	Number	Complete relief	Improved	Not improved	Local anæsthetic only	Alcohols	Treatment discontinued Psychological reasons	Reactions	Referred for other treatment
1. Embolism—peripheral	3	1	2	..	2	1	..	..	..
2. Traumatic occlusion femoral artery	3	0	2	1	3	..	..	..	..
3. Peripheral vascular disease with gangrene or ulceration	11	0	9	2	4	7	..	..	2 amputations
4. Thrombophlebitis —acute	13	11	2	..	11	2	1	..	1
—recurrent	3	..	3	..	1	2	..	..	1*
5. Post-phlebitic —chronic pain and œdema	2	2	..	..	2	..	..	..	..
—dermatitis	2	..	..	2	2	..	..	2†	..
6. Cerebral thrombosis	2	..	2	0	2	..	..	..	..
MISCELLANEOUS									
1. Keloids	4	0	4	0	1	3	..	..	..
2. Pain in knee from disease of hip joint	2	2	..	..	2	..	..	..	2
3. Erythromelagia	1	0	0	1	1	..	..	..	1

*Pulmonary embolus femoral vein ligation.
†Dermatitis increased.

3. *Vascular disturbances* (Table IV).—Blocking of sympathetic ganglia and pathways results in a maximal vasodilatation in the segment of the body served by the nerves which are blocked, and the removal of reflex vasomotor effects in these segments. These effects are used in the treatment of many vascular disturbances, for diagnosis in others, and to prognosticate the results of surgical sympathectomy where such may appear to be indicated.

When an embolus lodges in an artery, the immediate disturbance of arterial circulation is usually much more widespread than can be accounted for by the mechanical obstruction produced by the embolus. These widespread effects are due not only to spasm of the artery involved, but to widespread reflex spasm of the vessels in the same autonomic segment. The blocking of the appropriate autonomic pathways will immediately relieve these reflex effects, so that the only defect in the circulation remaining will be the primary one due to the mechanical obstruction by the embolus. The same effects may be observed in arterial occlusion due to thrombosis. In addition to the direct relief of the spastic reflex effects, the collateral circulation will be maximal because of the resulting vasodilatation in the part, so that in some cases the effect of the original arterial occlusion may become insignificant. I have seen these reflex effects persist after embolectomy, to be relieved promptly by sympathetic block.

Such reflex effects occur not only in the familiar case of occlusion of an artery of an extremity, but also in the case of occlusion of pulmonary, cerebral, and probably the coronary vessels. I have had personal experience only with the cerebral patients, but the literature contains convincing reports of the relief of the distress of patients with coronary occlusion and pulmonary embolism, and the immediate regression of symptoms such as hemiplegia and aphasia in patients with cerebral vascular occlusion, following appropriate blocking of vasomotor reflex pathways.

In patients with peripheral vascular disease temporary improvement may often be obtained through sympathetic blocks with local anæsthetic solution or alcohols. This improvement is frequently adequate to relieve pain for a considerable period, and to permit the healing of chronic ulcers and superficial areas of gangrene. It must be stressed, however, that this treatment in no way influences the progress of the disease, though it may postpone its effects. I have known such treatment to postpone an inevitable amputation for a year or more, a postponement which

has great psychic value in a patient who is not prepared to admit the seriousness of his disease, and so not prepared to submit at the time to such drastic treatment as amputation of an extremity. Moreover, following amputation, sympathetic blocks can assist in the healing of a doubtful stump.

Thrombophlebitis is sometimes classified with the reflex dystrophies, and this is perhaps logical because in many respects the phenomena are identical. However, since there is undoubtedly occlusion of a blood vessel, I have described it as a vascular disturbance. The picture of the cyanosed, tensely swollen and painful leg of the patient with acute thrombophlebitis, is familiar to all of us. More rarely is the upper extremity involved. Here, I think, an exaggerated example of a reflex dystrophy will be recognized. There exists here not only the inflammation and thrombosis in the affected vein, but a concomitant spasm of veins and accompanying arteries. No other form of present treatment will provide the immediate relief of pain, re-establishment of circulation and reduction of œdema which follows blocking of the sympathetic nerves serving the extremity. Additional treatment may be considered advisable as prophylaxis against extension of thrombosis or the throwing-off of emboli, but that is a matter of surgical opinion which I do not intend to discuss here.

Many patients suffer recurring minor attacks of thrombophlebitis with progressing disability. Such attacks are readily dealt with by repeated sympathetic blocks, and if taken early enough may be almost entirely aborted.

The post-phlebitic swollen painful leg may be greatly improved by a series of procaine blocks of the lumbar sympathetic trunk. Usually the swelling, if of long standing, will be little affected, but in my small series I have not seen a patient of this type who could not be entirely relieved of pain if adequately treated.

I am aware that the treatment of angina pectoris by alcohol block or surgical section of the thoracic cardiac nerves is a controversial issue. It is claimed that such ablation of the pain in this disease will lead to over-exertion and death from cardiac failure. White and Smithwick point out that in man the vasoconstrictor fibres to the coronary arteries run in these nerves, so that destruction of these pathways should improve the coronary circulation. Moreover, it appears that patients who have absence of pain following such treatment do experience other signs of distress on exceeding their exercise tolerance. Need they then be condemned to suffer the severe pain—and the anticipation of pain—which this disease entails?

There is at least one other surgical condition which has improved remarkably following serial sympathetic blocks of the involved segments, but which I hesitate at present to place in any of the three classes I have outlined. In attempting to reduce the irritation of keloid scars, no improvement was found following infiltration of the scars or repeated blocking of the somatic roots, but sustained improvement and rapid regression of the keloid has occurred following frequently repeated sympathetic block. This I cannot explain, but this result has been obtained now in four patients, and has been confirmed by Dr. John Carroll at the Queen Mary Veterans' Hospital in Montreal (Figs. 3a and 3b).

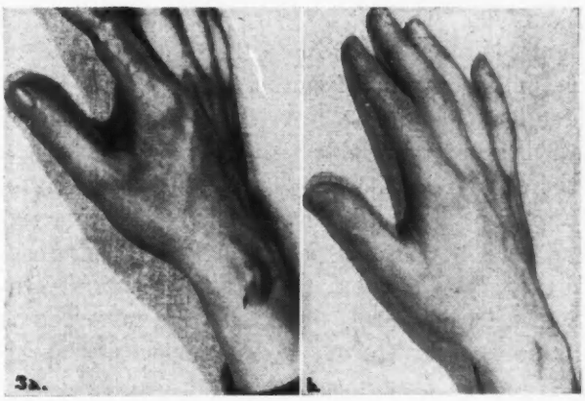

Fig. 3.—(a) Keloid on wrist and index finger prior to treatment by block of stellate ganglion. (b) Same patient two months later following series of six stellate ganglion blocks with procaine 1%. Note disappearance of diffuse keloid index finger and regression of keloid at wrist.

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"... What we know and what we think ... is a stream which flows by us and through us, fed by the far off rivulets of long ago. As what we think and say today will mingle with and shape the thoughts of men in the years to come, so in the opinions we are proud to hold today, we may, by looking back, trace the influence of the thoughts of those who have gone before...."
—Sir Michael Foster.

A SIMPLIFIED TECHNIQUE FOR THE DETERMINATION OF PROTHROMBIN TIMES*

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THE development of methods for measurement of prothrombin, particularly by Quick,[1] represents an important advance in the field of hæmatology, and the determination of prothrombin times has become a routine clinical procedure for the regulation of dicoumarol therapy. However, in the hospital lacking a highly specialized section devoted to this, and for the physician in private practice, there are a number of serious disadvantages to the Quick prothrombin time. For example there is a delay of several hours in receiving the report. This results in the practice of basing the daily dosage of dicoumarol on the prothrombin level determined 24 hours before. In addition the significance of the actual prothrombin time value depends on the details of how the test is conducted. This is such a great variable that an interpretation of the data from the laboratory is required rather than a prothrombin level or a prothrombin time in seconds. This is particularly true of the increased prothrombin time after the administration of dicoumarol, since with the same normal value an increase of ten seconds with different techniques may mean a slight change in the prothrombin concentration in the blood, or it may mean the approach to hæmorrhagic levels. However, it is only the largest hospitals that have a sufficiently large number of determinations to warrant the amount of routine checking on the method required for accurate interpretation of the value obtained.

Another important factor which has been recently established is the definite significance of calcium concentration for the prothrombin time after dicoumarol. Jaques and Dunlop[2] showed that while normal prothrombin times are little affected by changes in calcium concentration, the latter has a marked effect on the increased prothrombin time following dicoumarol. They found that the concentration of calcium used in the determination of prothrombin times is the optimal concentration, and much stronger than the physiological concentration of calcium, so that the hæmorrhagic tendency present with decreased concentration of prothrombin is greatly masked in the Quick test. These results have been confirmed by Quick[3] and the findings suggest that determinations of the prothrombin time at the physiological concentration of calcium should be of greater value than determinations at any other level.

Ziffren, Owen, Hoffman and Smith[4] in 1939, described a technique for the determination of prothrombin times using whole blood, the "bedside method". This consisted in determining the clotting time of the blood added directly to thromboplastin. This method avoids the difficulties of the Quick method outlined above. As the determination is completed in thirty seconds, it can be conducted as a part of the routine daily examination of the patient. The method has not been widely used but appears to merit further investigation. It would appear to approach more closely the measurement of the physiological mechanism under investigation than the recalcification methods. It is possible that the neglect of the method is due to the difficulty of comparing the results obtained with a known decrease in prothrombin. Quick standardized his method by constructing a curve for various dilutions of normal plasma, assuming that this represented corresponding decreases in prothrombin alone. While recent work[5, 6, 7] indicates that this assumption is not justified, the procedure does provide a simple way to characterize the method. Such a procedure is more difficult with whole blood. However, with the recent development of the use of silicone by Jaques, Fidlar, Feldsted and Macdonald[8] it is possible to obtain blood and plasma without the use of any anticoagulant and from this to prepare a series of blood samples containing varying dilutions of plasma, and hence of prothrombin.

In the present communication is reported a simple method of determining the whole blood prothrombin time. This method has been used by one of us (P.G.S.) over a period of two years in regulating cases under dicoumarol therapy with entirely satisfactory results.

METHOD

Thromboplastin.—Thromboplastin is prepared from desiccated rabbit brain according to the method of Quick.[1] A commercially prepared

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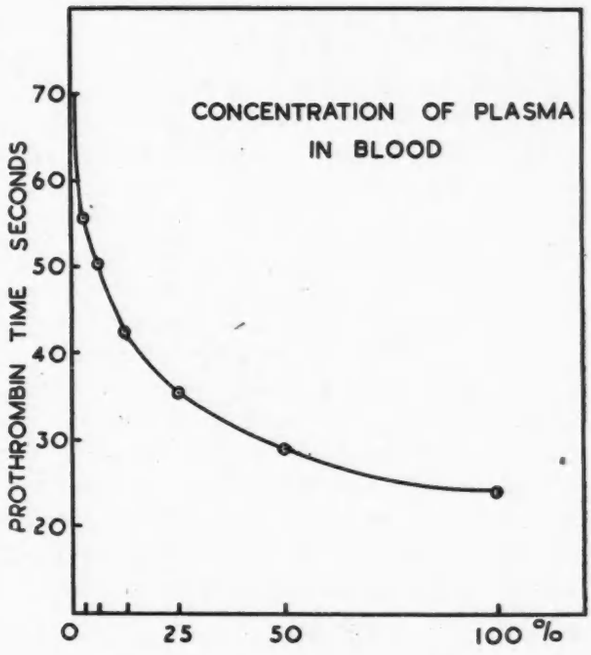
acetone-dehydrated brain powder is used. In the present series this was the Difco Laboratories preparation; 0.3 gm. of the dried brain are thoroughly mixed with 5 c.c. of freshly prepared physiological sodium chloride solution and incubated at 55° C. for 15 minutes. The coarse particles are removed by slow centrifugation, or by spontaneous sedimentation and the milky supernatant liquid obtained. The thromboplastin is placed in wide-bore capillary tubes (over 2 mm. in diameter and 4 inches long), with about 2 inches being drawn into each tube. The tubes are sealed in a flame and immediately frozen in the freezing compartment of a domestic refrigerator, and kept frozen until used. It has been found that this thromboplastin extract will remain unchanged in activity for as long as six months when preserved in this manner. The above quantity is sufficient to fill three dozen capillary tubes, sufficient for the same number of prothrombin determinations. Before use, the tube is removed from the refrigerator and warmed in the hand, if required for immediate use.

Determination of prothrombin time. — The contents of one capillary tube is expelled into the centre of a watch-glass. Approximately 2 c.c. of venous blood is drawn using a 20 gauge needle, and four drops of blood are added from the needle to the thromboplastin on the watch-glass. The needle is removed from the syringe. The watch-glass is held on the tips of the fingers and its contents are mixed immediately with the needle. The needle is passed gently through the mixture until it clots. The end point has been found to be very sharp. The prothrombin time is the time from adding the first of the four drops of blood to the end point. The normal prothrombin time by this method is 23-25 seconds. A neat venous puncture is imperative, as searching for the vein subcutaneously will release tissue juice and the prothrombin time will be abnormally shortened. Very occasionally, when a fresh thromboplastin extract is prepared, prothrombin times for the normal blood will be outside this range, in which case the extract is discarded and a fresh one made.

Standardization of the method.—The method was standardized by using a series of red cell-plasma mixtures containing varying dilutions of plasma. Using silicone-treated needles, glassware, etc., as described by Jaques, Fidlar, Feldsted and MacDonald[8] 10 c.c. of blood was obtained and the plasma and red cells separated; no anticoagulant was added for this procedure. A mixture of two drops of red cell suspension plus two drops of plasma (measured from a twenty gauge needle) was made. Similarly 1:2, 1:4, 1:8, 1:16, 1:32 dilutions of plasma were added to the red cell suspension to give a series of blood samples containing 100, 50, 25, 12.5, 6.25 and 3.1% of the normal concentration of prothrombin. The prothrombin times of these blood dilutions were determined using the above technique. Thirteen normal individuals in the laboratory were used as subjects, and 18 standardization experiments were performed to give a corresponding number of curves. Five curves were obtained in which there was very little difference of prothrombin time with dilution of the plasma. The reason for this anomalous finding will be the subject of future investigation. It was evidently due to the technique of obtaining the blood samples since others were obtained from several of these subjects which showed the normal effect of plasma dilution on prothrombin time. After removing these anomalous data the values of the prothrombin time at each plasma dilution for ten subjects were averaged, and the means plotted to give a smooth curve (Fig. 1) for the relationship between plasma concentration (prothrombin concentration) and whole blood prothrombin time.



It can be seen that a prolongation of five seconds corresponds to a dilution of 1:2 or 50% prothrombin concentration, a prolongation of 11 seconds to a dilution of 1:4 or 25% prothrombin, and a prolongation of 18 seconds to 12.5% prothrombin. This curve approximates that reported by E. V. Allen[9] as used at the Mayo clinic for the plasma prothrombin times, using the Magath modification of the Quick method. The normal prothrombin time is three seconds longer by our method using whole blood. However, the curve obtained using the whole blood prothrombin time is essentially the same as that obtained with the Quick method in this range of prothrombin activities.

DISCUSSION

The method described has been used over a period of two years in regulating a series of cases on dicoumarol therapy and has been found entirely satisfactory. In only one case was gross hæmorrhage encountered as a complication. This was a case of central retinal thrombosis given heparin for 48 hours followed by large doses of dicoumarol. The prothrombin time was maintained at a level corresponding to less than 20% of the normal prothrombin in an attempt to restore vision, as the patient was congenitally blind in the other eye. The thrombosis and the vision cleared completely with the therapy by the tenth day but on the 11th and 12th days the patient experienced moderate epistaxis. This was controlled by vitamin K therapy.

There has been some discussion in the literature regarding the detection of increased coagulability of the blood in thrombosis and allied conditions by detecting a shortening of the prothrombin time to below normal values. In our series of cases using this method, prothrombin times shorter than normal have been observed occasionally. A patient suffering from an acute coronary attack, on whom the prothrombin time was determined a few hours before death, showed a prothrombin time of 17 seconds. Four cases of phlebitis also showed prothrombin times of 16-19 seconds. We hope to obtain further information regarding this point.

The standardization curves are of value in placing the whole blood prothrombin time method on a basis, analogous to that used for the plasma methods. It is not, however, proposed to use this curve to convert the values for prothrombin time to concentration of prothrombin in the blood. Recent work indicates that this is not theoretically sound even with the original Quick method. The increased prothrombin time following the administration of dicoumarol is not due solely to a change in prothrombin concentration but involves other changes in the system which can be best described at present as changes in prothrombin activity.[2, 10] The standardization curves demonstrate, however, that similar criteria can be used for this method in the control of dicoumarol therapy, namely an increase in the prothrombin time above normal, of five to thirteen seconds corresponds to the therapeutic dose level of dicoumarol, while an increase of fourteen seconds indicates an approach to the hæmorrhagic state.

It is our contention that accurate estimation of the hypo-coagulability following dicoumarol is possible by this bedside technique and that because of the simplicity of the preparation of the thromboplastin and of the actual technique of the test, the method lends itself for use especially in smaller hospitals and office practice. The fact that the prothrombin time is determined immediately before the administration of the next dose of dicoumarol, increases the safety factor in dicoumarol therapy. This is a point of considerable value in the use of a drug as potentially dangerous as dicoumarol.

SUMMARY

A simple rapid method for the determination of prothrombin times is described. The prothrombin time is determined by adding the whole blood to thromboplastin at the time the blood sample is drawn. The thromboplastin extract is dispensed in capillary tubes and stored in the frozen state, so that it is immediately available for the individual determination. By taking blood in silicone, it has been possible to standardize the method in terms of per cent of prothrombin.

The above was assisted in part by a grant from the National Research Council of Canada to L.B.J. We are indebted to Mrs. V. P. MacLeod and to Miss Erica Lepp for their skilful technical assistance, and to Miss Joan Hepworth of the Department of Mathematics for statistical analysis of the data. We also wish to acknowledge the helpful suggestions of Dr. J. Kaufmann, Royal Victoria Hospital, Montreal, in whose laboratory the development of the method was first undertaken by P.G.S.

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KIDNEY SUBSTITUTES IN URÆMIA: THE USE OF KOLFF'S DIALYSER IN TWO CASES

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THERE occurs from time to time, fortunately not commonly, some catastrophe producing severe acute insufficiency in previously functioning kidneys. Examples of this include transfusion and other severe hæmolytic reactions, sulfonamide oliguria, heavy metal poisoning, reflex anuria with or without cortical necrosis.

In many instances the histological appearance of the kidneys indicates that the acute injury is not necessarily irreversible. Some of the cases, aided by a nice correction of extra-renal disturbances, recover before succumbing to the effects of uræmia; many others might be expected to do so if some form of substitution therapy permitted longer survival. This may apply also to certain exacerbations or injuries in chronic renal disease.

The pioneer work of Abel, Rowntree and Turner[1] in 1913 demonstrated in animals the feasibility of providing a kidney substitute but the lack of both a suitable anticoagulant and a simple dialysing membrane prevented its successful clinical application. Putnam[2] in 1923 and Bliss, *et al.*[4] in 1932 demonstrated the efficacy of the peritoneum as a dialysing membrane and Rhoads[5] made a limited application of the principle. Seligman, Frank and Fine[15] later developed a successful application of peritoneal lavage for uræmia and reported clinical experiences with its use[16, 17] and their method has since been employed by others[19 to 25] with considerable success.

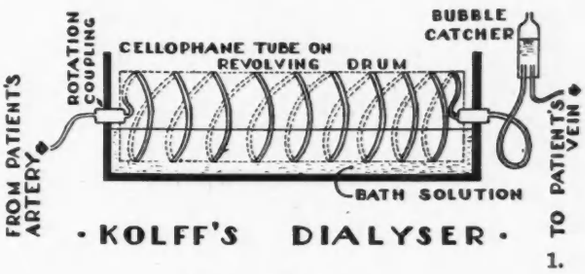
Lavage of various parts of the gastro-intestinal tract[31] including the stomach[4, 18] the duodenum[3, 8] jejunum,[26, 27, 32] ileum, colon,[13, 33] have been employed with varying and on the whole limited success. The animal experiments of Seligman *et al.*[15] indicated that of these gastro-intestinal sites, the jejunum afforded the best dialysing area. Thalhimer, Solandt and Best[6, 7] in 1938 successfully employed exchange transfusion in laboratory animals but obvious risks have prevented its application to humans.

In recent years there have been independently developed effective mechanical dialysers or "artificial kidneys" by Kolff,[9 to 14] Murray,[29] Alwall.[28, 30] These all employ the principle of running large quantities of blood through a cellophane tubing immersed in a water bath containing essential electrolytes; blood clotting is prevented by heparin.

Recently, McLean and others[34] have reported the successful application of Kolff's dialyser and it is the intention of the present paper to report its use in two cases, in one of which was an apparently life-saving measure.

METHOD

The general principles and detailed application have been fully described and illustrated in Kolff's[12, 13] writings. Blood is run in continuous fashion from an artery into the mechanical dialyser and returned cleansed into a vein; coagulation is prevented by heparin. The dialyser (Fig. 1) consists basically of a long cellophane tube (such as is used for sausage casing) wound spirally around a wooden drum which rotates at 25 to 30 R.P.M. through a large water bath containing essential electrolytes and



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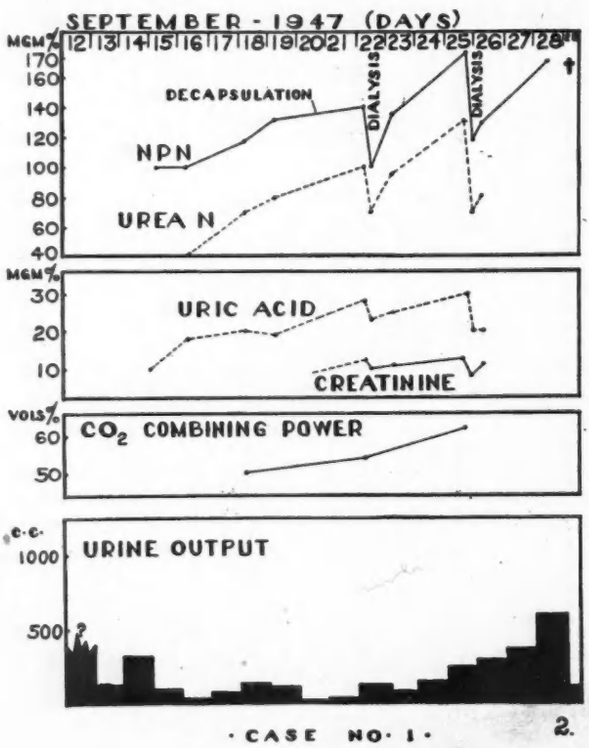
glucose. A special hollow axle and rotation-coupling at each end permits continuous blood flow during the drum rotation. All parts in contact with the blood are kept sterile, and the cellophane is an efficient barrier to bacteria so that sterilization of the water bath and other parts of the apparatus is unnecessary. The temperature of the bath is maintained by a heating element. Bubbles are trapped before the blood is returned to the patient. The apparatus holds 500 to 800 c.c. of blood and this temporary loss to the patient is compensated by preliminary intravenous therapy using blood transfusion if necessary.

The apparatus provides an enormous dialysing surface (about 24,000 square cm.) over which blood is constantly streaming in a thin film and its efficiency has been closely compared to the normal kidney.[12] One of us was fortunate in meeting Dr. Kolff in Holland in 1945 and seeing his apparatus demonstrated. Through his courtesy and interest detailed plans were obtained and a replica was later manufactured

in Vancouver for use at Shaughnessy Hospital, (D.V.A.). Length of cellophane tubing employed by us was 50 feet. The bath water for the first dialysis contained NaCl 0.6%, $NaHCO_3$ 0.2%, KCl 0.04%, glucose 2.0% in 100 litres of tap water; for the other dialyses the glucose was raised to 2.5%, and in the third dialysis the NaCl was reduced to 0.55%.

CASE 1

Mrs. R.E.J., aged 23. Previously healthy young woman who was admitted to hospital on September 12, 1947, in moderate shock from premature separation of the placenta at term and massive hæmorrhage. Past history was irrelevant. Her nutrition was good and there was no gross œdema. Pulse 120, blood pressure 90/70. She was given 400 c.c. of plasma and 500 c.c.



of Group "O" unmatched blood without apparent reaction. She was delivered of a stillborn child that evening. Her blood pressure rose to 140/110. Another transfusion of 500 c.c. of matched Group "A", Rh positive blood was followed by a slight chill. The day after admission she voided 10 oz. of urine but the next day only 2 oz. of turbid brown urine could be obtained, and severe oliguria with rising nitrogenous retention continued thereafter as shown in Fig. 2. On September 19 irrigation of the renal pelves was done and next day bilateral renal decapsulation. The subcutaneous and perirenal tissues appeared œdematous and the kidneys were reported of normal size but mottled in appearance; renal biopsy showed bilateral cortical necrosis.

She became nauseated with vomiting, listless with intermittent irritability and headache, and appeared hydræmic and puffy but there was no gross œdema. Gastric suction was maintained and she was given 2,000 to 3,000 c.c. of 5% glucose intravenously in water daily and almost daily blood transfusions, though the Hb. remained between 33 and 54%. By September 22, the non-protein nitrogen had risen to 140 mgm. % and on that day she was treated by blood dialysis using Kolff's technique, which was repeated again on September 25, with results that are shown on the diagram (Fig. 2). The first dialysis continued for eight hours with a blood flow through the apparatus of less than 50 c.c. per minute (3,000 c.c. per hour) which was largely limited by an inadequate venous return. The second treatment lasted six hours with a blood flow of 100 to 160 c.c. per minute (6,000 to 9,000 c.c./hour). Both dialyses were well tolerated, the pulse rate ranging between 110 and 116 and the blood pressure 130/70 to 140/80. Temporarily after each treatment she was symptomatically a little better except that there was some nausea and transient chilliness after the second procedure and evident œdema later appeared. During and after the second dialysis, there was a moderate hypocalcæmia (6.9 mgm. % to 6.2 mgm. %) which was only partially controlled by repeated intravenous calcium. Blood sugar reached 1,000 mgm. % during that dialysis but dropped to normal in the next twelve hours. At the end of the second treatment the non-protein nitrogen had fallen to 118 mgm. % and eight ounces of turbid urine were obtained in the next hour, urine flow thereafter gradually increasing. She began to take fluids by mouth and small feedings. On September 28 she was given 500 c.c. of packed cells and 150 c.c. of triple concentrated plasma by slow drip. That evening she became dyspnœic and cyanotic but improved after sedation without evidence of gross pulmonary œdema. However, the episode recurred early September 29 and she died on the 18th day of disease.

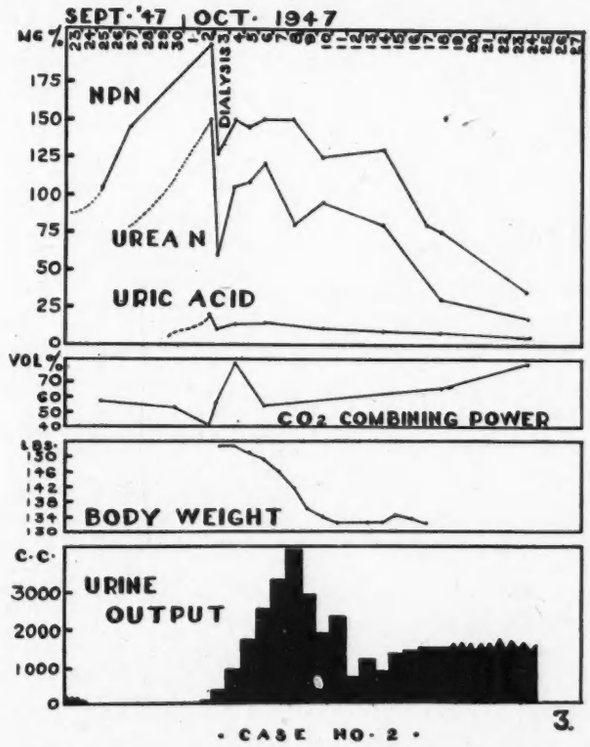
Post-mortem examination showed moderate general œdema and pulmonary œdema, the latter apparently being the immediate cause of death; bilateral cortical necrosis in otherwise normal kidneys.

Comment. — Although the bilateral cortical necrosis of the kidneys was severe, the post-mortem findings suggested that there was still sufficient remaining viable cortical tissue to permit considerable return of renal function. This she appeared to be doing until her sudden death on the 18th day of disease which again emphasizes the precarious position of these patients unless the uræmia is relieved early. The blood and concentrated plasma administered the day before she died may have contributed to her difficulties by upsetting a finely balanced pulmonary circulation. The two periods of dialysis were well tolerated and produced temporary symptomatic improvement as well as measurable effects on the retained nitrogenous products. A gradual but increasing diuresis followed the second more effective dialysis. The first dialysis was less efficient due to the smaller rate of blood flow from an inefficient venous return. The high blood sugar of 1,000 mgm. % during the second dialysis produced no untoward effect and it was present while the uræmia appeared to be symptomatically a little relieved. The renal decapsulation appeared to have been ineffective.

CASE 2

Mrs. S.S., aged 36. A previously healthy white female induced an abortion in the third month with "slippery elm" on September 22, 1947, producing lower abdominal pain and profuse hæmorrhage later that day.

She was admitted the next day in moderate shock with hæmoglobin 54%, temperature 103°, pulse 100, moderate distension and marked diffuse abdominal tenderness. Diagnosis: septic abortion with possible peritonitis. She was started on penicillin and given 500 c.c. of matched compatible Group "O" Rh positive blood without reaction. Oliguria proceeded to anuria with rising nitrogenous retention as shown in Fig. 3. A remittent fever to 101 and 102° subsided to normal by October 9, 1947. She was given repeated blood transfusions without reaction maintaining the hæmoglobin at about 75%. Fluid requirements were maintained with intravenous glucose solution and occasionally saline as required. On September 27, a splanchnic block was done without apparent effect on the kidneys. By October 21 (9th day of oliguria) the non-protein nitrogen had risen to 200 mgm. % and she was nauseated, vomiting, with some irritability and drowsiness and appeared hydræmic but not grossly œdematous except for some pulmonary congestion. On that day a blood dialysis was done using Kolff's technique but with a reduced concentration of NaCl in the bath (0.55%). The dialysis was maintained for six hours with a blood flow varying between 50 and



110 c.c./min. Venous return was impaired by a painful phlebitis in the vein which had been in prior use for continuous intravenous therapy. The treatment was otherwise well tolerated, pulse varying between 110 and 120 and blood pressure 140/80 and 120/80. At the end of the dialysis the non-protein nitrogen had fallen to 126 mgm. %, hæmoglobin fell from 73 to 59% while the CO_2 combining power had risen from 42 to 62 volumes % and later to 81 volumes %. Symptoms of uræmia had considerably cleared and she was asking for some fruit juice. She passed 120 c.c. of turbid urine shortly after completion of the dialysis and put out a total of 330 c.c. on the same day. Her progress thereafter was one of steady uneventful recovery as shown in the diagram and she left hospital apparently well on October 25. Two-hourly urine test October 20 showed specific gravity range of 1.009 to 1.017 with a trace of albumen in some of the specimens. She was last seen May 25, 1948 when she reported no symptoms of urinary insufficiency and a urine specimen (early a.m.) showed specific gravity 1.025 with no albumen or abnormal constituents.

Comment.—Although this patient received a blood transfusion prior to the onset of anuria, review of the blood groups revealed no evidence of incompatibility and it is believed that the kidney failure was due to "reflex anuria" or incomplete bilateral cortical necrosis. She was capably treated along conservative lines for nine days but uræmia became markedly worse, pulmonary œdema developed and she appeared water-logged but not frankly œdematous. It was generally believed that she would not survive unless something more effective was done. The dialysis was well tolerated until the sixth hour when she became more restless and felt chilly but by this time the nitrogenous retention had been considerably relieved and a diuresis had commenced which continued with eventual complete clearing of uræmia and water retention. Whether this diuresis can be attributed in any considerable measure to the dialysis is not certain owing to the tendency to spontaneous diuresis in these cases but it seems entirely likely that the kidneys may have been relieved of some suppressing toxic product as suggested by others. The raised blood sugar and the induced hydræmia may have contributed.

Efficiency of the Method and Technical Application

Our experiences confirm the observations of others that this apparatus will effectively reduce nitrogenous retention, undoubtedly also clearing many other substances unmeasured by us. It seems quite fair to expect that this will at least prolong life for a limited period as in animal experiments,[15, 30] permitting further opportunity for kidney recovery. Whether or not it has any direct beneficial effect on the kidneys is problematical, though this also is possible, as noted above. The technical application of the method is not difficult though it is time-consuming both in immediate preparation and during the actual treatment and requires constant supervision by physicians who are duly prepared to attend promptly to any accident or breakdown. The main risk lies in a break in the arterial connection but as long as one is in readiness to apply the necessary tourniquet this risk is negligible and is further minimized by suitable care in preliminary adjustments. Tears or leaks in the cellophane tubing are infrequent and can be removed while stopping the drum for a few minutes. The bubble-catcher requires observation

to maintain a suitable column of blood and prevent the passage of air.

The time required for an effective treatment is largely dependent on the amount of dialysing surface prepared and the rate of blood flow maintained. We employed fifty feet of one inch cellophane tubing and obtained rates of blood flow varying between 50 and 160 c.c./min., continuing treatment between six to eight hours. It is likely that the treatment time could have been shortened, or the dialysis improved, by lengthening the cellophane tubing and increasing the rate of blood flow, as recommended by Kolff. In two instances the venous return could not keep up to the arterial outflow, which had to be controlled. As there was no evidence of clotting in the veins, it appears that the veins we selected (saphenous) were either too small or suffered spasm. In one instance we made the error of employing an existing venous connection which had been in use some hours for intravenous glucose and which suffered a chemical phlebitis; recurring pain limited the rate of flow during the subsequent dialysis.

The method can be used wherever there are ordinary hospital and laboratory facilities. A team of trained technical assistants would relieve the tedium of preparing the apparatus but the actual treatment requires the constant supervision of a suitably trained physician.

The patient and immediate treatment effects.—Although the treatment imposes an A-V shunt, there occurs no apparent characteristic effect on cardiovascular function except for a slight tachycardia. Blood pressure and pulse pressure are essentially unchanged which seems due to the fact that the shunt is proportionately small, probably no greater than 3 to 4% of the cardiac output.

As the rate of blood flow in and out of the body is considerable (6 to 12 litres/hour) there is a risk of overtaxing the patient's thermal control but this can be prevented by the necessary care to the temperature of the bath water and of the blood at the venous end of the circuit.

Since the essential electrolytes are readily dialysable and tend toward equilibrium with the large volume of bath water their control is relatively easy with the exception of calcium which must be replaced directly from time to time during the treatment. In Case 1 a moderate hypocalcæmia (6.9 to 6.2 mgm. %) required treatment during and several days after the dialysis but this may have been related to the continuing uræmia. However, with any of the kidney substitutes, control of water balance remains one of the greatest difficulties due to unequal osmotic forces between the blood and the dialysing fluid. Owing to the absence of a colloid in the present bath solution there is no adequate osmotic balance against the plasma proteins. Glucose in the water bath exerts a certain osmotic effect which diminishes by diffusion during treatment but it seems to us that even in the initial concentrations of 2 to 3% its osmotic effect is insufficient. Although our patients were not weighed before and after dialysis they both appeared rather more hydræmic after treatment than before, and in Case 2 the hæmoglobin drop of 73 to 59% in the six hour dialysis was almost certainly due to hydræmia.

Pulmonary œdema as in Case 1 is a frequent cause of death so that a better control of water balance is highly desirable. In Alwall's apparatus hydrostatic pressure is apparently effective. In Kolff's apparatus the outward centrifugal force is probably negligible at optimum rates of drum rotation (25 to 35 R.P.M.) so control of water balance largely depends on: (1) maintaining sodium concentrations at the lowest safe levels, and (2) the use of some substance in the bath that will act as a colloid.

1. In our first two dialyses we used 0.6% NaCl and 0.2% $NaHCO_3$ as recommended by Kolff but in the third dialysis (Case 2) we used 0.55% NaCl and 0.2% $NaHCO_3$ which was well tolerated though it produced a moderate hypochloræmia and a mild alkalosis. It now seems to us that a NaCl concentration of 0.57% recommended elsewhere[23] would be quite safe for long dialyses and would supply a minimum sodium concentration for water-holding in tissues. Somewhat lower concentrations may be safe for short periods of dialysis depending on the pre-existing state of hydræmia, œdema, and the serum chlorides. However, if such smaller quantities of NaCl are used it appears desirable to use somewhat smaller amounts of $NaHCO_3$ in order to prevent alkalosis. Needless to say, it is important to have observations of the serum chlorides and CO_2 combining power at appropriate periods during the course of the dialysis to prevent serious

changes. Observations of the blood calcium and non-protein nitrogen levels are desirable during dialysis but less important for treatment control. We are now equipped with a bed scale for weighing the patients during treatment which will provide accurate information about the state of water balance.

2. The matter of providing a suitable colloid for the bath water has been insufficiently studied. Plasma proteins cause too much gross foaming in this apparatus but should be suitable for other types (Murray, Alwall) if required. Neutralized gelatin also foams in amounts over 1% but has been insufficiently examined by us. Isinglas, sodium silicate and dextran (Schenley) are possible substitutes that could be tested for suitability.

Heparinization.—We used 800 mgm. of Connaught heparin given at the start in the first two dialyses and 600 mgm. in the third (Case 2) being governed by the recommendations of Kolff who used considerably higher dosage. This produced marked prolongation of the coagulation time—over 90 min. in both instances. Our patients had large ulcerated uterine surfaces and, in Case 1, large recent (48 hour) renal incisions in spite of which no observed bleeding occurred. We cannot agree, therefore, with the statement[32] that because of the required heparinization blood dialysis is contraindicated after surgical procedures.

Obviously we used much more heparin than was required, as apparently the product we used was more effective than that formerly available to Kolff. Metal cannulas were used, as suitable glass cannulas were not prepared at the time the cases appeared. In future we intend to use less heparin, in the order of 300 to 400 mgm. to start with, and 50 to 100 mgm. during dialysis depending on the blood coagulation time. An initial dose of 150 mgm. recently used by others[34] seems rather low as the control of clotting is so important to the successful application of the method. When protamine sulphate becomes generally available, the risks of heparinization will be reduced.

Glucose in the bath water.—In the first dialysis, a concentration of 2% was used, in the second and third dialyses 2.5% without untoward effect. In the second dialysis (Case 1) the blood sugar rose to 1,000 mgm. % at a time when the drowsiness and irritability of the uræmia were clearing. This steadily dropped to normal after the dialysis. In the second case, the hyperglycæmia appeared to be partly controlled by a small dose of insulin given with the idea of prolonging the osmotic effect of the bath glucose. The induced hyperglycæmia in these cases is a commentary on the significance of the raised blood sugar in diabetic coma.

Indications for the method.—Blood dialysis is indicated in the treatment of any severe renal failure when there is some prospect that the kidneys may regain adequate function in a relatively limited time. This would include most cases of acute renal failure and some suitable cases of exacerbation in chronic renal disease. As uræmia is attended with severe general disturbances, it is unlikely that the available kidney substitutes will permit indefinite survival, although Kolff makes the interesting suggestion[14] that in the future it may be possible to keep patients going for long periods.

It is difficult to say exactly how soon the method should be employed in any given case. Usually patients with unrelieved complete renal failure will die in eight to twelve days, and many will die sooner from other complications or injuries; some will survive a few days longer and die suddenly. Though the possibility of a spontaneous diuresis and recovery remains to the end, the risk of sudden deterioration and death increases with each hour that recovery is delayed.

The important question is: are the dangers of disturbing an ill patient by applying a kidney substitute greater than the risks of continuing conservative measures and awaiting a spontaneous diuresis? Our own experiences and those of all others who have used this particular method show that it is well tolerated by seriously ill patients and does not produce any immediate significant upset. The greatest risk lies in aggravating a disturbed water balance, but this is usually greatest late in the disease. Therefore, the use of dialysis should not be delayed too long. Suitable correction of all extra-renal disturbances should be made, taking care not to overhydrate the patient. Any special conservative measure that appears to be indicated in the particular circumstance should be employed, such as ureteral irrigation or sympathetic block. When this has been done it is now our opinion that if after a limited period of days, (four to six), there is no clear indication of returning renal

function the patient should have the benefit of a kidney substitute, used on several occasions if indicated. This will give additional time for recovery to occur and may even have a direct beneficial effect on the kidneys themselves.

Comparison with other substitutes.—All forms of massive dialysis convey certain risks of disturbing fluid and electrolyte balance and thermal control, of the general order discussed above. The various methods employing portions of the gastro-intestinal tract or the pleura appear to be inadequate for the most part. Peritoneal lavage is effective but carries certain special disadvantages, namely the risk of peritonitis, of ileus, difficulties in maintaining an adequate flow, small losses in proteins and the long period of dialysis required; all of these problems have been successfully met in certain instances. The various methods requiring special apparatus for external dialysis (Kolff, Murray, Alwall) carry the potential risk of hæmorrhage from heparinization or from an accident at the arterial connection (Kolff, Alwall); so far this risk has never actually materialized, and as noted above our own experience has shown that recent major operative procedures are not necessarily contraindications; the risk of infection is negligible and the effects of the A-V shunt imposed (Kolff, Alwall) are not important. Our own experiences are limited to the use of Kolff's dialyser and the use of peritoneal lavage by one of us.[22] On this limited basis and from review of some of the literature, it is our opinion that external dialysis is superior and presents no peculiar disadvantages that cannot be successfully controlled in a majority of suitable cases.

SUMMARY

1. The place of kidney substitutes is briefly discussed and the available techniques reviewed; these include dialysis through various living tissues in the patient, or externally by apparatus employing cellophane tubing.

2. Our experience with the use of one kidney substitute (Kolff's dialyser) in two cases is recorded. In one of these cases the treatment appeared to play a major rôle in recovery.

3. Kolff's dialyser is effective in the reduction of uræmia and may aid in the immediate recovery of renal function.

4. The indications for the use of kidney substitutes are discussed and the employment of effective kidney substitutes relatively early in the disease is recommended.

5. Some general comparisons of the various kidney substitutes are made.

This work was made possible by the Department of Veterans' Affairs which allotted funds for the apparatus. The work was done for the Department of Medicine, Shaughnessy Hospital, under Dr. M. M. Baird. The authors wish to acknowledge the kind help and interest of Dr. W. J. Kolff who supplied detailed plans of his apparatus and instructions in its use. The co-operation of the National Machinery Company Ltd. of Vancouver, B.C. in devoting time and attention to the construction of the apparatus, without profit, is gratefully acknowledged. Our thanks are due to Dr. J. L. Coltart and Dr. E. O. DuVernet for referring the cases for treatment. This paper is taken from material presented at the Staff Meeting at Shaughnessy Hospital, December 9, 1947.

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A METHOD OF EXCISION AND PRIMARY CLOSURE OF PILONIDAL CYSTS AND SINUSES

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IT is the purpose of this paper to present a method of excision and primary closure of pilonidal cysts and sinuses. This method was used successfully by the author in 20 consecutive cases at Christie St. Hospital between January, 1946 and January, 1947. Its features are: (1) a good functional and æsthetic result; (2) hospitalization period of 10 days; (3) the simplicity of operative technique; (4) no dressing care; (5) low recurrence rate.

The problem of pilonidal cysts and sinuses is an annoying and baffling one. According to Holman, it accounted for approximately 360,000 sick days in the U.S. Navy during 1942 and 1943. The results of operation are discouraging. Failures from operation average 20 to 25% in various reported series. Recurrences have been known to occur up to 5 years after operation; but the majority appear within the first year.

The technique used was one of radical excision and primary closure with drainage by means of a small Penrose drain for 24 hours through a separate stab wound. Penicillin and sulfathiazole were given systemically prior to and following operation, and dusted locally in the operative wound. Most surgeons now agree that open pack methods require weeks and even months for healing to occur, and a wide, delicate scar, adherent to the sacrum, which breaks down under the repeated trauma of civilian life, is the best that can be achieved.

Different methods of excision, different means of closure and different dressings were tried in the first 10 cases until finally the procedure which will be outlined was found best and used for the last 10 cases. The principles of radical excision, primary closure and drainage however, were carried out in all the cases.

Diagnosis.—The diagnosis of this condition is usually simple. Any cyst, sinus or inflammatory lesion in the region of the sacrum or coccyx is evidence of pilonidal disease until proved otherwise. Fistula-in-ano may be confused with this condition but usually can be ruled out by proctoscopic examination.

Etiology.—The etiology is still uncertain. It may be congenital, due to improper fusion of the midline ectoderm, or due to persistence of the coccygeal vestiges of the neural canal. It may be acquired. Repeated trauma may excite a pre-existing condition. Some observers feel this is an acquired infective lesion due to ingrown hairs. The fact that the disease is present, chiefly in male service personnel would suggest that trauma plays a part.

Pathology.—Pilonidal cysts are usually in the midline; however, the sinus tracts may extend laterally into the buttocks for varying distances. The tracts may extend inferiorly as far as the anus and are usually limited anteriorly by the fascia of the sacrum and coccyx. Some sinus tracts are said to be connected with the neural canal, but this condition was not noted in this series.

The pathological report of specimens at operation invariably consisted of a cyst-like cavity with sinus formation. The cyst was usually lined by stratified squamous epithelium with varying degrees of ulceration and replacement by granulation tissue. In all cases, chronic inflammatory tissue was present, and in 20% of the cases there was frank suppuration. In the recurrent cases, ulceration, suppuration and granulation tissue were present but no evidence of epithelial tissue was found.

Incidence.—This is primarily a disease of the young adult male. The ratio of males to females is about 6 to 1. All the patients in this series were males, ranging in age from 20 to 37 years with an average age of 25 years.

Symptoms and signs. — The most common symptoms are a mass and discharge at the base of the spine. The usual story is that of repeated attacks of a painful swelling at the base of the spine, which finally discharges, relieving the pain. The discharge may persist, but usually stops, only to return at a later date. Symptoms in this series varied from 2 weeks to 20 years, with an average duration of 2½ years.

Swellings of varying degrees and numbers were present in all cases and a definite sinus was evident in all but 2 cases. Two cases had been operated on for correction of this condition previously; the recurrence occurred in one case in 5 months, the other in 7 months. Another 3 cases had incision and drainage performed before admission to hospital. Seventy per cent of the cases had a purulent discharge from one or more sinuses at the time of ad-

mission, and 60% were operated on with a persistent purulent discharge.

The cultures of the discharging sinuses revealed the following organisms in order of frequency: (1) *Staphylococcus saprophyticus.* (2) *Non-hæmolytic streptococcus.* (3) *Staphylococcus aureus.* (4) *Bacillus coli.* (5) Diphtheroid bacillus. A few cases had 3 of the above organisms present.

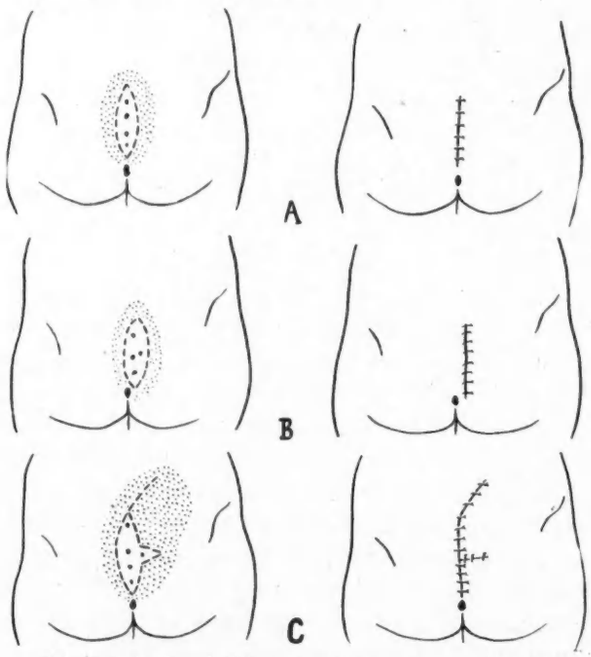
Preoperative preparation.—Ideally, operation is carried out on these cases in a quiescent state. However, in 12 (or 60% of this series) a moderate degree of discharge was present at the time of operation. These cases presented a history with little or no freedom from discharge, and in none of these was the condition considered an acute inflammatory one.

In 3 cases acute abscesses were incised prior to radical procedures, and the acuteness of the inflammation allowed to subside with the help of chemo-therapy, penicillin and sitz baths before excision and closure was carried out. Incisions of abscesses were vertical and as close to the midline as possible, making subsequent excision more easily done.

When a patient was considered ready for operation, the following procedure was carried out: (1) A laxative was given two nights prior to operation and enemas until clear given the evening before operation. (2) Fluids, rich in carbohydrates, were given the day before operation. (3) Penicillin, 20,000 units q.3 h. intramuscularly, was begun 24 hours prior to operation and continued until the sutures were removed. (4) If *B. coli* or other penicillin-resistant organisms were present in the discharge from the sinus, sulfathiazole therapy was carried out as well as the penicillin therapy.

Operation.—(1) Spinal anæsthesia is used if no contraindication is present and the patient is placed in the prone jack-knife position. (2) The operative area is prepared with cetavlon, which, unlike iodine, alcohol or ether, is a non-irritant to the rectal mucosa and scrotum. (3) If any sinuses are present they are probed for extent and the area is palpated for induration.

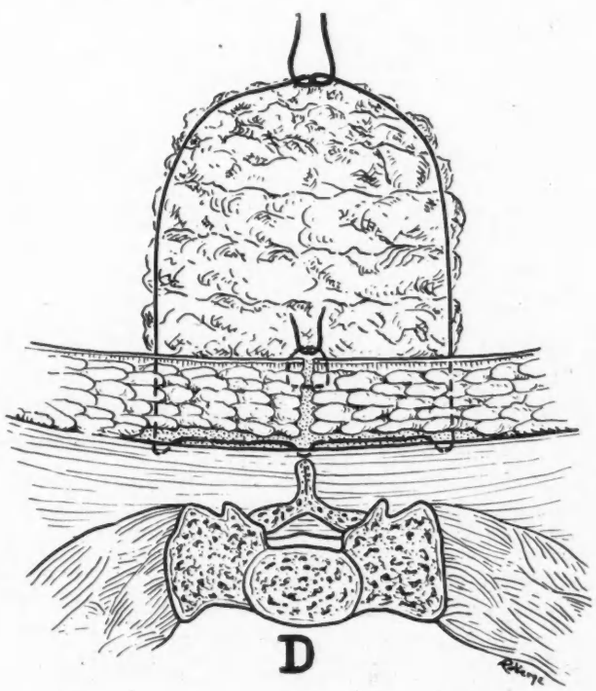
(4) Using Bonney's Blue, the affected area is mapped out by an elliptical skin marking which represents the line of skin incision. The line of incision is at least half an inch beyond the outer limit of induration or sinus tract. An ellipse of skin whose greatest transverse diameter does not exceed 4″ can be removed, and the defect closed without difficulty (see Fig. A). If the disease extends for 2″ to one side of the midline and only ½″ to the other, then the centre of the elliptical incision and the resultant suture line is to one side of the midline (see Fig. B). While preferable, it is not absolutely essential to have the centre of the incision in the midline. If the narrow sinus tract extends into the buttock, in addition to the elliptical incision, a "V"-shaped resection of the sinus tract is carried out and the defect closed without tension by enlarging the incision upwards and curving it to the side of the defect. Wide undermining and shifting of the skin flap is then carried out (see Fig. C). By using these procedures on 4 cases, large buttock rotation flaps or lateral relaxing incisions were found to be unnecessary.



(5) Methylene Blue is injected gently down any patent sinus tracts. (6) The open sinus tracts are cauterized with 60% silver nitrate solution and the operative area is again prepared with cetavlon. (7) An incision is made along the elliptical skin marking. The blade of the knife is kept at right angles to the tissue, and a careful watch is kept for evidence of dye or granulation tissue. If any is encountered, the incision is enlarged, using a new scalpel. The incision is carried down through skin and subcutaneous tissue to the fascia overlying the sacrum and gluteal muscles. An elliptical block of tissue is removed. (8) The skin edges are undermined in the layer between the fascia overlying the gluteal muscles and the subcutaneous tissue for a distance of 2″ or so, in

order that the skin edges may come together without tension.

(9) Hæmostasis is made complete by means of the electrocautery. An occasional large, perforating vessel is ligated with "000" plain catgut. The cauterization of bleeders is a time-saver, renders hæmostasis more complete and does away with foreign body suture material in the wound. (10) No. 32 interrupted stainless steel retention sutures are situated about 1" apart, and placed as follows: The suture passes through skin and subcutaneous tissue at the outer limit of the undermining which is usually about 2" from the midline. A small bite is taken in the fascia of the gluteal muscles and another bite in the fascia overlying the sacrum and through the corresponding situation on the other side. Five to six of these sutures are usually used (see Fig. D).



D

(11) A stab wound is made about 1" above the upper limit of the incision and a narrow Penrose drain is passed through this incision down to the resected area. (12) The wound is well irrigated with saline solution and dusted with a small amount of penicillin and sulfathiazole powder. (13) The skin is closed, using interrupted mattress sutures of "C" silk. Only if perfect apposition of the skin edges is obtained can the stitches be removed on the 8th postoperative day. (14) The incision is painted with Whitehead's varnish to prevent infection of the suture line from the outside and to keep it dry. (15) A large roll of flat gauze about 4 to 5 inches in diameter is placed over the suture line and the steel retention sutures tied over this gauze with pressure firm enough to prevent the collection of serum but not enough to cause tissue necrosis. Additional pieces of fluff gauze and abdominal pads are used to apply firm, even pressure over the buttocks, and the Penrose drain is made long enough to be easily reached near the upper end of the dressing. The dressings are kept in place by elastoplast. Tincture of benzoin co. is applied to the skin to avoid skin irritation.

Review of operation.—The main factors about the operation are as follows: (1) Radical block excision of skin and infected tissue. (2) Wide undermining of skin and subcutaneous tissue to prevent tension on suture line. (3) Absolute hæmostasis by the use of electrocautery instead of catgut, preventing foreign body tissue reaction. (4) Drainage of serum, which is produced postoperatively in the so-called dead space, by means of a small Penrose drain for 24 hours through a separate stab incision. (5) Accurate approximation of skin edges, allowing sutures to be removed on the 8th day postoperatively. (6) Full thickness of skin and subcutaneous tissue over the sacrum, providing a pliable, non-adherent scar. (7) Obliteration of the dead space by a large, firm, pressure dressing held in place by through-and-through steel retention sutures, which prevents hæmatoma and movement, so essential for primary firm union.

Postoperative nursing care. — The patient is placed in the face-down position for 48 hours. Thereafter he is allowed on his side only. Only fluids are given by mouth, for a period of 8 days, with 2 drams of tincture of camphor co. t.i.d., in order to prevent bowel movements. The Penrose drain is removed in 24 hours without removing the dressing. The dressing is removed in 8 days and the skin sutures and steel retention sutures are removed. The incision is then painted with 20% tincture of mercurochrome. Patient is given a laxative and a soft diet. On the 9th day the patient is allowed up. On the 10th day he may be discharged from hospital.

Results. — As stated previously, it was not until the last 10 cases that the technique as described was used. In the first 10 cases, primary union occurred in 7 cases by the 10th post-

operative day, with discharge from hospital in an average of 18 postoperative days. In 3 cases in this group the successful end result was delayed because of skin necrosis. In one case where buttons were used with retention sutures in an effort to obliterate the dead space, two areas of skin necrosis about half an inch in diameter occurred.

The other 2 cases had a small degree of ischæmic necrosis of the skin edges due to one or more of the following reasons: (1) Too many retention sutures, too close together, under too much pressure. (2) Too much subcutaneous tissue removed near the skin edge producing a deficient blood supply to the skin margin. It was for this reason, in the following cases, that a full thickness of subcutaneous fat was left intact at the skin margin. This also prevents adherence of the scar to the sacrum. (3) Too small and too tight a pressure dressing.

These 3 cases required an average of 43 postoperative days before complete healing occurred. Failure at primary union in 10 days was not due to hæmatoma or infection in this series. In one of the first 10 cases, discharge from hospital was delayed for one week because of a rather painful burn of the scrotum, caused by spilling of ether and iodine on the scrotum during the skin preparation at operation. This incident showed the advantage of cetavlon which is a non-irritant.

In the last 10 cases operated on by the method outlined, primary union occurred in 8 days, with no postoperative complications and discharge from hospital occurred in an average of 13 postoperative days. The last 3 patients operated on were discharged from hospital on the 10th postoperative day. All the patients returned to work 3 weeks after discharge from hospital.

Recurrences.—To date, 18 months after the last operation, of the 20 cases operated on, 2 have recurred; one in the first 10 cases and the other in the last 10. Both cases had a purulent discharge at the time of operation which, on culture, grew *Staph. saprophyticus,* non-hæmolytic streptococcus and *B. coli.* One case had had excision and primary closure 5 months prior to my operating on him and since then has had 2 recurrences with 2 further operations done elsewhere. The other case had no previous operation and has had a second operation carried out at Christie St. Hospital 6 months after the first operation, which is a success to date.*

Causes of poor results.—The poor results in the treatment of this condition are due to causes which may be divided into the following headings:

Preoperative causes. — Operation performed when condition is acute. Operation should only be undertaken in the quiescent state and preferably when there is no discharge. The 2 failures in this series had a purulent discharge at the time of operation.

Operative causes.—(1) Tissue dealt with at operation is always infected. (2) Inadequate removal of infected tissue. (3) Poor hæmostasis, resulting in hæmatoma. (4) Incomplete obliteration of the "dead space". (5) Tension on suture line. (6) Insufficient care to closely approximate the skin edges. (7) A poor pressure dressing. (8) The use of a non-absorbable foreign body suture material in the wound, or the use of suture material such as chromic catgut in which there is a large amount of tissue reaction present.

Postoperative causes.—(*a*) Too much movement will give rise to postoperative hæmatoma or delayed tissue healing. (*b*) Contamination of the wound with fæcal material.

SUMMARY

A method of primary closure for pilonidal disease has been presented. It is simple, the hospitalization period is extremely short, the dressing and nursing care is negligible, the result is good functionally and æsthetically and the recurrence rate is low.

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* Since my leaving the General Surgery Service, Dr. W. F. Wales has followed this method of excision and primary closure and has operated on 8 additional cases with successful results and no recurrences, which, along with the other 20 cases, represents a recurrence rate of 7%.

L'homme est visiblement fait pour penser. C'est toute sa dignité et tout son mérite, et tout son devoir est de penser comme il faut.—*Les Pensées* de Blaise Pascal (1623-1662).

THE AZYGOS VEIN IN TOMOGRAPHY

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THE tardy radiological recognition and demonstration of the azygos lobe by Bendick and Wessler in 1928, though the condition had been anatomically described by Wrisberg in 1778, seems to be paralleled by a similar delay in the radiological recognition of the vena azygos in antero-posterior planigraphs. The anatomical features of normal and abnormal azygos veins have been known for many years and the appearance of the azygos vein of the normal individual in the antero-posterior planigraph was described by Nuvoli in 1941.

We have encountered several verbal references to an oval radio opacity seen in the antero-posterior planigraphs taken at the level of the trachea and usually lying in contact with the junction of the upper margin of the right bronchus with the trachea. It has been variously attributed to a normal gland, an enlarged lymph gland indicating infection in the upper lobe, neoplasm, etc. These observations prompted us to review some planigraphs done in this department over the past two years.

Of 130 antero-posterior planigraphs which intersected the region in question, we encountered eight azygos lobes. The oval shadow referred to in the preceding paragraph was absent in the azygos lobe cases and present in all the remainder. The position varied between the extremes shown in Figs. 1 and 2 with the vast majority lying in the lower position.

The oval shadow referred to averaged 10 x 12 mm. in size: 53 having lesions of the right upper lobe, showed an average area of the shadow the same as for the entire group. In several of these cases the densities immediately below the right upper lobe bronchus were greater than average, and this increase was attributed to lymph gland enlargement at that level. In two of the series, an increase in the size of the shadow was observed after a five months' interval. Both of these had lesions in the upper lobe. In the azygos lobe cases, the shadow averaged 6 mm. in diameter.

In one case a double shadow was seen. Each measured about 8 mm. in diameter. The first was at the usual site and the second lower and more laterally located in contact with the upper lobe bronchus. It is presumed that the latter was a gland.

CONCLUSIONS

1. As the shadow is not seen in relation to the trachea or bronchus in cases of azygos lobes, we feel that it is reasonable to conclude that usually one does not demonstrate any gland at the above site. It is possible in the two cases showing an increase in size over an interval of time, that the shadow was a composite one of a cross-section of the vena azygos and an enlarging gland. The lone double shadow case strengthens this remote possibility.

2. The disparity in size between the cross-section of the vena azygos in an azygos lobe case and in a normal case does not mean that the shadow of a normal case must be a composite

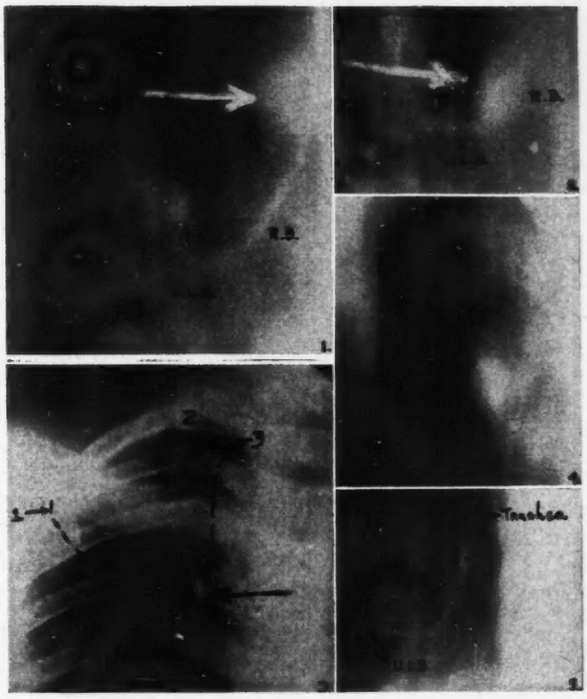

Fig. 1.—Antero-posterior planigraph showing upper limit of the radio-opaque oval shadow of the azygos vein. **Fig. 2.**—Antero-posterior planigraph showing lower limit of the radio-opaque oval shadow of the azygos vein. **Fig. 3.**—Type 2 vena azygos lobe—dotted lines show sites of types 1 and 3 vena azygos fissures. The veil effect of the extra layers of pleura superimposed on the vena azygos lobe tissue in type 3 is a common observation. One cannot be certain that this effect is due entirely to the extra layers of pleura. There is a possibility of inadequate aeration from constriction of the bronchus by the vein. **Fig. 4.**—Planigraph through an azygos lobe showing the cross-section of the vein, the fissure and the absence of the oval shadow seen in Fig. 2. **Fig. 5.**—Planigraph of the course of the vena azygos vein as demonstrated by an oblique projection in an azygos lobe case—dotted line along centre of vein.

one. The disparity may be attributed to some attenuation of the vein due to the stretching of it over and through the right upper lobe in azygos lobe formations.

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RESPIRATORY ALLERGY DUE TO FUNGI*

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MOST physicians, dealing with allergic problems, meet with many cases of seasonal allergy which are not satisfactorily explained by pollinosis. For many years I have seen cases of seasonal rhinitis and asthma whose symptoms occurred before the earliest tree pollination, during the period between the grass and weed seasons, and in particular after the weed season, in the late autumn. I was often puzzled by patients presenting symptoms after the early September frosts had destroyed the weed flowers. Such patients usually recovered promptly on the first heavy snow fall in late October or early November.

There were many histories of a peculiarly striking kind. Children playing in the dry fields in early April, after the snow had gone and before the trees flowered, would develop sharp symptoms. Adults, similarly, developed symptoms when clearing up the dead leaves and other debris of the previous season. In short, there was a sizable group of seasonal allergies which could not possibly be explained by anything other than fungus spores.

Cadham[1] of Winnipeg, in 1924 reported three cases of asthma due to rust spores and Van Leeuwen of Holland in the same year suggested that common atmospheric spores in Holland, particularly aspergillus and penicillium, were common causes of asthma. Up to 1935 there were a number of published references to spore sensitivity, chiefly from Europe, but mostly of a strictly occupational or environmental kind, and usually not seasonal. In 1935 Feinberg[2] *et al.* called attention to the prevalence of sensitivity to alternaria and to its widespread character as well as to its marked seasonal nature. Since that time a great many reports of spore allergy have appeared and it is now recognized as a most important type of inhalant sensitivity.

Dudley and I[3] had been studying pollen slides exposed in Winnipeg and noted the large number of spores obtained from the air. In 1939, impressed by Feinberg's reports and others and by the probable incidence of mould allergy in our practice, we commenced a special study of the air-borne spores in Manitoba and three years ago published our data for the period 1939 to 1944.[4] We have continued these studies each year since then, and in 1947 and again this year have collaborated with the Mould Spore Committee of the American Academy of Allergy in a continent-wide survey. Our data for the nine years, 1939 to 1947, are sufficient to give us a reasonably accurate picture of atmospheric spore conditions as they apply in Manitoba. While there is much variation from year to year, the overall pattern is constant. Our findings are very much like those published from several centres in the American midwest.

It would be impossible in a short report of this kind to outline all the characteristics of the moulds which we think are clinically important. Generally spores can be found on exposed slides from early April to mid-November and occasionally throughout the winter. When culture plates are used, colonies will develop throughout the year.

Spores of aspergillus, penicillium, monilia, rhizopus, mucor and yeast cells are found fairly constantly throughout the year and without much seasonal variation, although they tend to be more prevalent in the warm months. These fungi can also be found in houses, barns, etc. The clinically important seasonal moulds are saprophytes which grow on dead and dying vegetation and include alternaria, hormodendrum and helminthosporium. Obviously these do not thrive or sporulate when covered with snow although occasional spores are found in winter, probably blown by the wind from exposed places. Para-

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sitic fungi such as rusts and smuts only occur when their host plants are thriving, namely at the height of the growing season in midsummer. Daily spore and colony counts vary greatly with atmospheric conditions but the marked seasonal pattern is definite and consistent from year to year. The mould count starts to rise early in April, reaches a peak in midsummer and persists at a high level until snow comes.

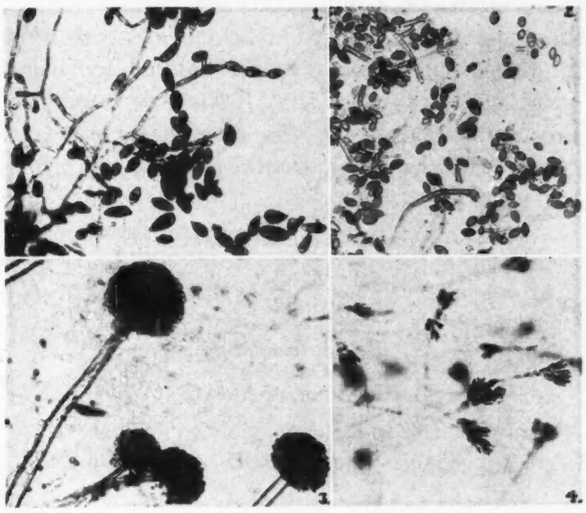

Fig. 1. — Microphotograph of part of alternaria colony (x 275), showing the spores both singly and in chains, and some mycelia. On exposed slides spores are often seen in chains of three or four. The dark brown ovoid spores, characterized by cross walls and occasional longitudinal walls, vary in size. The average length is about 40 μ. The colonies are grey-green in colour and fluffy, turning dark when the spores are mature. **Fig. 2.**—Microphotograph of part of a hormodendrum colony (x 275), showing spores and fragments of mycelia. While not shown in this section, on exposed slides the spores occur commonly in branched chains, smallest spores at end of chain. They are smaller than alternaria, ovoid, pale brown, and have no cross or longitudinal walls. The colonies are olive-green in colour and velvety. On the reverse side they are black and crack with age. **Fig. 3.**—Microphotograph of part of an aspergillus colony (x 275), showing mycelia and fruiting heads. Scattered throughout the field are a few solitary conidiospores. The numerous spores grow in chains attached to the heads on conidiophores by very short wide-based stalks (sterigmata). **Fig. 4.**—Microphotograph of part of a penicillium colony (x 275). The conidiospores are borne in chains on branched conidiophores (broom-like). The colonies are mostly green in the centre with white mycelia around the edges. The colonies are often indistinguishable, except microscopically, from some species of Aspergillus.

Rusts and smuts cannot be artificially cultured and hence are found only on exposed slides. Alternaria, hormodendrum and helminthosporium are readily recognized and counted on slides and on exposed culture plates. All the other fungi can be identified only by culture.

If one contrasts the seasonal characteristics of pollen it will be readily seen that mould-sensitive cases can often be detected by their seasonal character. Further, the observation already made of the effects noted when stirring up dead vegetation as in play is most suggestive. Finally, mould-sensitive patients are usually worse in the country than in the city and of course they do badly in the vicinity of granaries and grain elevators where such moulds are abundant at all times.

The antigenic nature of many moulds has been clearly demonstrated by many workers and there can be little doubt of their rôle in inhalant allergy. Observers in various locations vary widely in their estimate of the relative frequency of clinical mould allergy. It is my clinical impression that fungus allergy is second in importance only to pollen in seasonal allergy.

Circumstances have not permitted me to analyze all the cases I have seen. Accordingly I have made a study of 275 successive cases of asthma, many with hay fever, seen in the past eighteen months. In the same period, there were many cases of rhinitis without asthma, but a study of these must await another occasion. It has been my experience that strictly seasonal cases of allergy are not as frequent as they would seem. That is, many seasonal cases have less severe but definite symptoms throughout the year. As is usual, allergic sensitivities are more often multiple than single and in many instances patients are sensitive to a variety of seasonal and non-seasonal antigens. Accordingly, I have chosen to study all cases of asthma presenting themselves in succession regardless of their type or etiology.

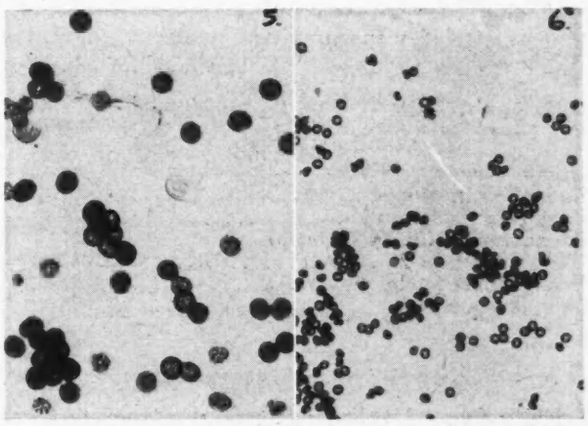

Fig. 5.—Microphotograph of wheat smut (x 275). The olive-coloured, spherical, echinulate spores usually adhere in masses. **Fig 6.**—Microphotograph of barley smut (x 275). Spores are very much smaller and smoother than those of wheat, but also adhere in clumps.

Of 275 successive cases of asthma seen in the past 18 months, including cases of all types, 99 cases (36%) showed skin sensitivity to fungi. Skin tests were all done intradermally, using 1/50 c.c. of a 1:10 dilution of the mould extract.* Reactions varied from slight to very marked. Eleven of these cases are of doubtful value as it was far from certain that moulds played any part in their asthma. Thus in a series of 275 cases of allergic asthma, 88 showed skin and clinical evidence of fungus allergy (32%). Such a group was not exclusively mould-sensitive, of course. Forty-five of these cases were primarily seasonal, although a few had symptoms out of their season from occasional non-seasonal sensitivities such as animal dust. The other 43 cases had symptoms periodically throughout the year but with definite seasonal exacerbations. Table I indicates the incidence of other sensitivities found in fungus-sensitive cases.

TABLE I.
88 FUNGUS-SENSITIVE CASES

Pollen-sensitive	72 cases
Grain dust sensitive	48 "
House dust sensitive	75 "
Miscl. inhalants, incl. animal, feathers, etc	71 "
Food-sensitive	29 "
Drug-sensitive	2 "

The age of these cases varied from infancy to over 70 years. In most instances symptoms had existed for many years prior to examination. Table II shows the number of cases in each age group, at time of diagnosis.

TABLE II.

Under 2 years of age	1 case
Pre-school (under 6 years)	4 cases
Pre-adolescent (under 13 years)	17 "
'Teen age (under 20 years)	11 "
Young adults (under 40 years)	27 "
Over 40 years	28 "
	88 cases

Fifty-five of these cases had associated allergic rhinitis, 18 had eczema, present or past, and 11 had other allergic manifestations. Fifty-three cases (60%) showed a blood eosinophilia of more than 5% on the initial blood examination, 51 cases (57%) gave a family history of allergy. The severity of the asthma varied from mild in 31 cases to very severe in 6. For some reason there was an unusual preponderance of males in the ratio of 53 to 36. Three-fifths of the cases were urban and the others rural.

The above very sketchy outline indicates, I think, that I was dealing with an average group of cases of allergic asthma. In studying these people, I tested them to 21 different fungus extracts as shown in Table III. These fungi fall naturally into 3 main groups, the seasonal saprophytes, the parasitic rusts and smuts, and the non-seasonal fungi.

TABLE III.
FUNGUS EXTRACTS TESTED

A. *Seasonal Saprophytes*
1. Alternaria.
2. Hormodendrum.
3. Helminthosporium.

B. *Seasonal Parasites*
4. Leaf rust of wheat.
5. Stem rust of wheat.
6. Crown rust of wheat.
7. Stem rust of oats.
8. Crown rust of oats.
9. Leaf rust of oats.
10. Bunt or wheat.
11. Barley smut.
12. Loose smut of oats.
13. Covered smut of oats.
14. Corn smut.

C. *Non-Seasonal Fungi*
15. Yeast.
16. Penicillium.
17. Lycopodium.
18. Mucor.
19. Monilia.
20. Rhizopus.
21. Aspergillus.

In Table IV, I have summarized my findings in the 88 cases of fungus allergy.

TABLE IV.

	No. of cases sensitive	*Clinically significant*
Seasonal Saprophytes (Alternaria, etc.)		
Marked skin sensitivity	43	43
Moderate skin sensitivity	34	16
Slight and doubtful skin sensitivity	10	—
Total	87	59
Seasonal Parasites (rust and smut)		
Marked skin sensitivity	20	12
Moderate skin sensitivity	23	5
Slight or doubtful skin sensitivity	13	—
Total	56	17
Non-Seasonal Fungi (penicillium, yeast, etc.)		
Marked skin sensitivity	38	36
Moderate skin sensitivity	29	10
Slight or doubtful skin sensitivity	5	—
Total	72	46

* This is the strength commonly referred to as 1 in 1,000 solution. That is the original extract, being the result of extracting 1 gram with 100 c.c. of fluid, is known as a 1:100 extract.

The seasonal saprophytes including alternaria, hormodendrum and helminthosporium gave definite skin reactions in 77 of the cases (87.5%) and these appeared to be clinically significant in 59 of the cases (67%). Symptoms attributable to these fungi were often severe, some of the skin reactions very active and in many instances reactions to hyposensitization were marked. General reactions occurred in some instances and very sensitive patients required as careful control of dosage as did very sensitive pollen cases. Results of hyposensitization therapy have been as encouraging as with pollen.

Skin sensitivity to the seasonal parasitic rusts and smuts was definite in 43 cases (48.8%) but clinical significance was accepted in only 17 eases (19.2%). In these cases symptoms occurred definitely when rust and smut spores were present in large amounts in the air and when other air-borne allergens did not seem to account fully for the symptoms. As will be seen in our previous report[4] the rust and smut season is short (4 weeks) and intensive, and varies from year to year from July to August. It was often extremely difficult to judge whether simultaneously occurring agents such as weed pollen or grain dust were not the chief or only offending agents. There were no cases in this series which were exclusively sensitive to rust or smut but I think there can be little doubt that their spores are of some clinical importance, especially among the rural population. Our rust and smut extracts were made from carefully collected spores, of single species, collected for us by the Dominion Rust Research Laboratory in Winnipeg. We think it unlikely that they were contaminated by other allergens such as alternaria as Feinberg suggests in his criticism of Cadham's report. In short, I think we demonstrated definite clinical rust and smut sensitivity in a few cases but for the reasons mentioned they appear to be of relatively minor importance. This is a fortunate circumstance, as these parasitic fungi cannot be cultured artificially except on their living hosts, the various cereal plants. Without the active and generous help of the Dominion Rust Research Laboratory it would have been all but impossible to prepare accurate and potent extracts for testing or treatment.

The non-seasonal fungi showed definite skin sensitivity in 67 cases (76%) but evidence of clinical sensitivity was thought sufficient in only 46 cases (52%). These cases are also very difficult to evaluate but observation and apparently successful hyposensitization seemed to justify the conclusion that they were of definite clinical importance in some cases. It would seem important to remark on the fact that many of the fungi of this group are found in sputum and other body discharges in non-allergic cases. It is doubtful if they are ever true pathogens and often they seem to occur in large amounts in the presence of other disease such as bronchogenic carcinoma. In contrast, pathogenic fungi such as actinomyces are rarely if ever allergenic. Yeast sensitivity seems to be important when used in baking but other allergenic agents such as flour may also be major factors.

SUMMARY

1. A brief review of the present day concept of fungus allergy is presented.

2. The properties of air-borne fungi as found in Manitoba, are reviewed.

3. In 275 successive cases of asthma, examined by the author in 18 months, 88 appeared to be definitely allergic to fungi.

4. The seasonal saprophytes, alternaria, hormodendrum and helminthosporium were of great importance in 59 cases (67%).

5. The seasonal and parasitic rusts and smuts were thought to be important in 17 cases (19%). Evidence is adduced which indicates that rust and smut are definite causes of asthma but only in a small proportion of cases and rarely, if ever, exclusively.

6. The non-seasonal fungi appeared to be clinically important in 46 cases (52%) but the difficulty in accurately evaluating their relative importance is pointed out.

CONCLUSION

Air-borne spores and cells of fungi are of major importance in the study and management of respiratory allergy in Manitoba and elsewhere.

I am indebted to Dr. Margaret G. Dudley for her invaluable technical assistance in the mycological aspects of this study, and to the Dominion Rust Research Laboratory at Winnipeg for supplies of rust and smut spores and for valuable advice.

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RENAL TUBERCULOSIS IN CHILDREN*

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RENAL tuberculosis occurs in two forms, the acute miliary, and the chronic. The acute miliary form is a part of the generalized condition, is not uncommon in children, is always bilateral, responds to no known treatment, with the possible exception of streptomycin, and usually runs a rapidly fatal course. Chronic renal tuberculosis, though not rare, is uncommon in children. During the past 15 years there have been only nine cases at the Children's Memorial Hospital in over 57,000 admissions. Chronic renal tuberculosis is usually unilateral early in the disease, and does respond to treatment as will be shown. Chronic, surgical renal tuberculosis will be considered here.

Campbell states that renal tuberculosis in children is almost always of the human type, and very rarely bovine. It is always secondary to some other focus in the body, and the route of infection is hæmatogenous. Most authors doubt if infection ever occurs by the lymphogenous route in children, and rarely if ever by direct extension from pleural, peritoneal, gastrointestinal or bone tuberculosis.

The primary lesions in the kidneys occur most frequently in the cortex, and occasionally in the cortico-pyramidal regions and in the pyramids. The usual course of events is that the bacilli lodge in the glomerular tufts and produce the primary lesions. These may heal or extend to other sites. Extension within the kidney occurs via the blood, the lymphatics, or the renal tubules. The small cortical lesions have a tendency to heal, and most do. The medullary lesions of the pyramids and cortico-pyramidal regions, however, have a tendency to extend and cause kidney destruction.

There are two types of tuberculous processes in the kidney, the ulcerative, that is the caseocavernous, ulcerocavernous, or pyonephrotic, and the diffuse nodulosclerotic. The former, a progressive, destructive process that does not tend to heal, and the latter which tends to be encircled, seal itself off, and heal. Tubercle bacilli will be found in the urine when the process extends into a tubule, erodes through a pyramid into a calyx, or breaks into the pelvis. The size and location of the lesion are no indication as to the number of bacilli present. The course of any particular case cannot be foretold. As Osler pointed out, there are two factors to be considered, there is the seed, and there is the soil, and these are difficult to evaluate. Hence, some cases show only healed cortical foci, and others show the progressive destructive lesions with caseation and cavitation.

Almost all authors state that the commonest symptom, increased urinary frequency, is present in about 90% of cases. Hæmaturia and renal pain are much less frequent, particularly in children. Campbell estimates that about one in every sixty cases of "so-called chronic pyelitis" is true renal tuberculosis. Harris, Medlar, and others have shown quite conclusively that there is no such condition as excretory bacilluria. Tuberculous bacilluria means renal tuberculosis, but as stated above, this is no criterion as to the extent of renal involvement, the site of the lesion, nor the prognosis. It means that the disease has extended to the renal pelvis, or a tubule has been broken into. Similarly, the absence of tubercle bacilli does not rule out renal tuberculosis. Medlar and Harris have shown that the cortical lesions tend to heal, but the medullary lesions are progressive, and rarely if ever heal spontaneously.

Fullerton has shown that tuberculin therapy is useless. Campbell feels that sanatorium treatment is beneficial for all cases including those suitable for surgery. Harris stated that renal tuberculosis is a slowly progressing disease, and in the early cases there is ample time for extended observation. The contraindications to nephrectomy according to Campbell are: bilateral lesions, aplasia or hypoplasia of the uninvolved kidney, or active tuberculosis elsewhere in the body.

Three of the nine cases observed at the Children's Memorial Hospital were not operated on, and their histories follow.

CASE 1

John C., two years old, was admitted in June, 1939, with pulmonary tuberculosis. Pyuria was present, and tubercle bacilli were demonstrated on culture and by guinea pig inoculation. At cystoscopy tuberculosis of the right kidney was found (Fig. 1). At that time the feeling was that nephrectomy was contraindicated in the presence of an active lung lesion, and hence operation was postponed. One year later he developed Pott's disease. In April, 1941, 2 years after admission, his

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condition showed improvement, and he was cystoscoped again. He was now found to have bilateral renal involvement (Fig. 2), and was sent to a sanatorium. He was readmitted in 1946 with marked urgency, frequency, and dysuria. At cystoscopy there was extensive severe cystitis with ulceration and bleeding. He expired 11 days after admission; necropsy was not obtained.

CASE 2

Lionel L. was first admitted at the age of 7 years with tuberculosis of the right hip. This was treated by fusion, and he did well. He left the hospital in February 1937. Two years later he was admitted to another hospital, the parents were told that he had "kidney trouble", and he was discharged.

Six months later, in November, 1939, he was readmitted to the Children's Memorial Hospital with marked urgency, frequency, and dysuria. There was marked pyuria, and tubercle bacilli were demonstrated on direct smear. The child was acutely ill, and could not be cystoscoped. A few days later he developed tuberculous meningitis, and died in 10 days. This was before streptomycin was available. At necropsy there was extensive caseous tuberculosis of the right kidney and tuberculous meningitis.

CASE 3

Mary R. was admitted in May, 1944, at the age of 14 years with Pott's disease of the dorsal spines. One year after admission she was found to have pyuria, but no urinary symptoms. Examination revealed a tuberculous lesion of the left kidney. In view of the active bone lesions nephrectomy was deferred. Six months later she was cystoscoped again, but at this examination there was evidence of bilateral tuberculous involvement. Nephrectomy was contraindicated, and she was transferred to a sanatorium. She was admitted to another hospital in May, 1948, for change of cast. The bone lesions have not healed, and she has some frequency and urgency with marked pyuria. She is a chronic invalid.

Of the six cases that were operated on, two had nephrectomy rather late in the disease, and their case histories follow.

CASE 4

Gerald F. was admitted in November, 1934, at the age of 12 years with pulmonary tuberculosis, and a lesion in the right hip. Six months later, on routine urinalysis, pyuria was found. Investigation revealed tuberculosis of the left kidney. However, the feeling at that time was that nephrectomy was contraindicated in the presence of an active tuberculous process elsewhere in the body, and operation was deferred. Fifteen months later, when the hip and lung had improved, he was reexamined, and the right kidney was still free of disease. The left kidney was removed, and it showed extensive tuberculous pyonephrosis. Postoperative course was uneventful, and urinalysis and urine culture were completely negative.

Six months later he developed urinary frequency and urgency. There now was a marked pyuria, and tubercle bacilli were found on direct smear and culture. There was no evidence of genital tuberculosis. He progressed poorly, and eight months later was admitted to another hospital with tuberculous meningitis, and expired after 8 days. Necropsy was not obtained.

CASE 5

Jeannine C. was admitted in December, 1947, at the age of 11 years for investigation of lower abdominal pain, fever, and dysuria. The urine on admission was loaded with pus cells, and the culture was enterococci. She improved with sulfonamide therapy, but the pyuria persisted. At cystoscopy there was a mild cystitis and a left hydronephrosis and hydroureter (Fig. 3) suggestive of tuberculosis. Urines were collected for guinea pig inoculation, and the diagnosis was confirmed. The child was cystoscoped again, and urine with pus cells and tubercle bacilli was obtained from both kidneys. The pyelograms were unchanged. In view of the bilateral lesions it was decided to start the child on a course of streptomycin and moogrol. The bladder urine continued to show pus cells and tubercle bacilli. After 30 days repeat cystoscopy revealed normal urine from the right kidney with a normal, unchanged pyelogram.

The left kidney was removed and showed destruction of the upper calyx. The child was continued on streptomycin and moogrol for 30 days after the operation. The urine became normal immediately after the operation, and the leucocyte count and sedimentation rate came down to normal. She was discharged in May, 1948, well and completely free of symptoms.

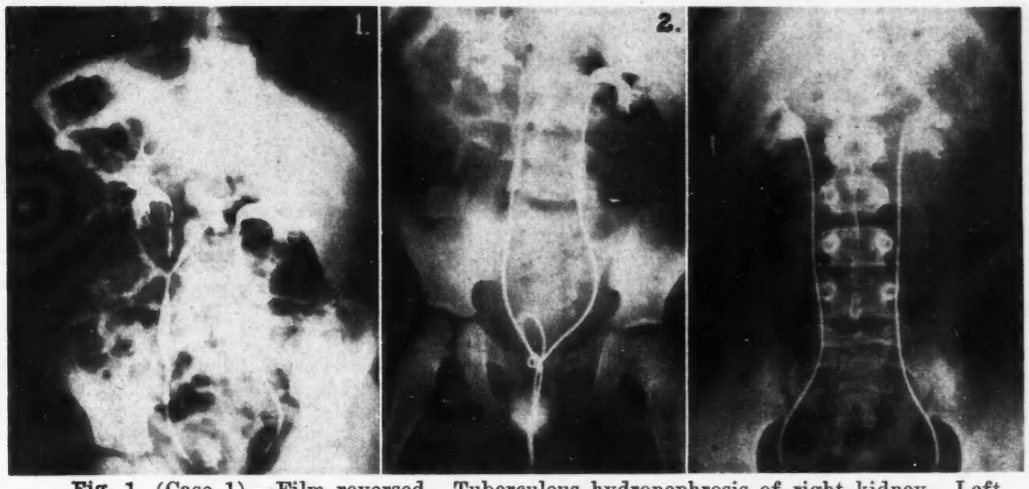

Fig. 1. (Case 1).—Film reversed. Tuberculous hydronephrosis of right kidney. Left kidney normal (November, 1939). **Fig. 2.** (Case 1).—Bilateral renal tuberculosis (July, 1941). Compare with Fig. 1 (film reversed). **Fig. 3.** (Case 5).—Tuberculous hydronephrosis, left. Normal pyelogram on the right.

The following four cases of unilateral renal tuberculosis were treated by nephrectomy early in the disease.

CASE 6

Peter W. was admitted in October, 1938, at the age of 7 years with complaints of increased urinary frequency and turbid urine for six weeks with an episode of gross hæmaturia 10 days prior to admission. He was known to

have had pulmonary tuberculosis at the age of 2 years.

Examination revealed an enlarged, firm, left epididymis. The urine was loaded with pus cells, and showed numerous tubercle bacilli on direct smear. At cystoscopy a marked cystitis was found and tuberculosis of the right kidney was demonstrated. Nephrectomy was performed, and the kidney showed extensive tuberculous involvement. Five months later the left epididymis was removed, and it showed fibro-caseous tuberculosis. Child was discharged apparently cured.

Repeated check-ups since that time have shown the child to be free of disease. He was last seen in April, 1948, and was perfectly well, with a normal urine.

Fig. 4. (Case 7).—Extensive renal tuberculosis left, normal pyelogram right. **Fig. 5.** (Case 7).—Left kidney removed at operation showing extensive tuberculous involvement with caseation and cavitation.

CASE 7

Beverley B. was admitted at the age of 8 months in February, 1946. She had an acute otitis media. The Mantoux was positive, and chest x-ray showed a tuberculous lesion at the right lung base. Routine urinalysis revealed a marked pyuria with numerous red blood cells, and tubercle bacilli were demonstrated on smear and culture.

At cystoscopy there was extensive tuberculous involvement of the left kidney; the right kidney was normal (Fig. 4). At the age of 11 months the left kidney was removed under spinal anæsthesia. The kidney showed extensive tuberculous involvement (Fig. 5). The postoperative course was uneventful, and there was rapid clearing of the pulmonary lesion. She was last seen in September, 1947, and was perfectly well, with a negative urine, and a healed lung lesion that was completely calcified. Report from the family physician in May, 1948, states she is free of symptoms with a negative urine.

CASE 8

Nigel M. was seen in March, 1946, at the age of 10 years because of burning on micturition. The urine was loaded with pus cells. Cystoscopy revealed a moderate cystitis with a tuberculous hydronephrosis and hydroureter on the left (Fig. 6). The right kidney was normal. The left kidney was removed and it showed extensive tuberculous caseation and cavitation. The postoperative course was uneventful, and the child was discharged free of symptoms with a normal urine one month later.

One week later the patient was readmitted with tuberculous meningitis, and expired 9 days later. This was before streptomycin and moogrol were available. At necropsy the tuberculous meningitis was demonstrated, and the right kidney was free of disease.

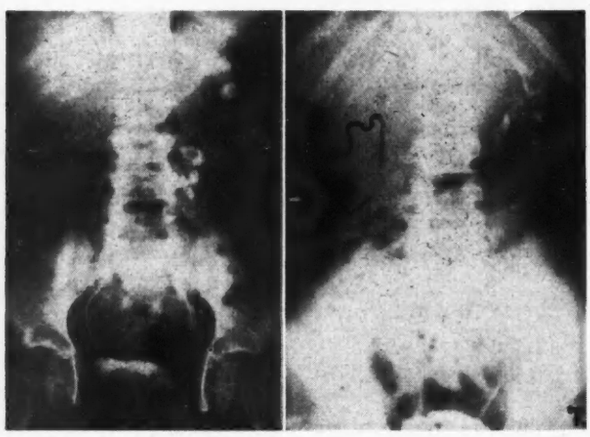

Fig. 6. (Case 8).—Tuberculous hydronephrosis and hydroureter left, normal pyelogram right. **Fig. 7.** (Case 9).—The right pyelogram is outlined to show the hydronephrosis: Left pyelogram is normal.

CASE 9

Jeanine T. was admitted at the age of 10 years with an active Pott's disease in August, 1947. She had pyuria, and the urine culture was *B. coli*. She had a mild frequency but this cleared up with sulfonamide therapy. However, the pyuria persisted. A 24-hour sample of urine showed tubercle bacilli on smear and on culture. Intravenous pyelogram (Fig. 7) showed a normal pyelogram on the left with poor concentration of the dye on the right, suggestive of a large hydronephrosis. At cystoscopy the left kidney was normal, but the right ureter could not be catheterized.

The right kidney was removed, and it showed extensive tuberculous involvement with caseation and cavitation. Postoperative course was uneventful, and repeated urinalysis, urine culture, and guinea pig inoculation have been negative. However, x-ray of the spine in February, 1948, showed some progression of the disease which it was felt was in part due to the extension during nephrectomy. The child was last seen in May, 1948, was well and free of symptoms, and the Pott's disease was progressing satisfactorily with cast immobilization.

SUMMARY

Nine cases of surgical renal tuberculosis were seen in 15 years in over 57,000 pædiatric admissions. Only four children had urinary symptoms, and of these, all had frequency, and only one had an episode of hæmaturia. The

other five cases were found on routine urinalysis. Two of the cases showed other organisms in the urine, and the symptoms disappeared with treatment of the non-specific infection. The urine became sterile on routine culture, but in both these cases the pyuria persisted.

Three of the nine cases were not operated on. In two the disease became bilateral while awaiting improvement in the co-existing bone lesions, and in the third the child had in addition tuberculous meningitis. Two of the three died, and the third is a chronic invalid with extensive bone and renal tuberculosis.

Two of the children were operated on rather late in the disease. The one was operated on 18 months after the diagnosis was made because of the co-existence of an active bone lesion. He developed tuberculosis in the opposite kidney, and died within 6 months. The other child was treated with streptomycin and moogrol pre- and post-operatively. It is assumed that she had small cortical lesions which responded to the treatment. The extensive lesions with caseation and cavitation were not affected in this case.

Four of the children were operated on early in the disease. The youngest was 11 months at the time of operation. Two cases had active bone or pulmonary tuberculosis at the time of nephrectomy. The infant with the active chest lesion did very well, and is alive and well today, two years later. The girl with the lower thoracic Pott's disease had some activation after the operation, but is doing well now. Of the remaining two cases with genito-urinary tuberculosis, one is alive and well after nephrectomy and epididymectomy more than 9 years ago. The other case had a tuberculous kidney removed in September, 1946, and died 6 weeks later of tuberculous meningitis. The child was found to have vesical and genital tuberculosis at necropsy. Had we had streptomycin and moogrol at that time this child might have been saved. Encouraging reports such as the one by MacLean, Smith, and their group lend support to this view. In children with surgical renal tuberculosis there nearly always was an active tuberculous process elsewhere in the body.

CONCLUSIONS

1. Surgical renal tuberculosis in children is not common; we saw only 9 cases in over 57,000 pædiatric admissions.

2. Persistent pyuria should always be investigated for tuberculosis by urine culture and guinea pig inoculation, and by cystoscopic examination.

3. Removal of the infected kidney (if not bilateral) should be performed as soon as diagnosed; (*a*) To prevent spread to the opposite kidney, ureter and bladder, which occurs rather rapidly in children. (*b*) The removal of that much tuberculous material aids in the healing of the remaining foci in the body.

It is to be hoped that the use of streptomycin and moogrol pre- and post-operatively will cut down the incidence of tuberculous meningitis.

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FINAL REPORT ON THE CANADIAN RED CROSS FOOD PARCELS FOR PRISONERS-OF-WAR

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FROM January, 1941, until the end of the war, the Canadian Red Cross Society packed and shipped for prisoners-of-war in Europe and the Far East nearly sixteen and a half million food parcels at a cost of $47,529,000. The cost of these parcels was defrayed jointly by the British, Australian, and Canadian Red Cross Societies.

The articles constituting the 11 pound food parcel were chosen primarily on account of their nutritional value and palatability. The amounts of the different articles and their caloric values are given in Table I.

A detailed discussion and reasons for the inclusion of each article have already been reported.[1] Minor changes were made from time

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to time, such as substituting raisins for prunes, honey for jam, coffee for tea, and the addition of onion powder, mustard and other condiments. However, the main items, such as the powdered milk, butter, cheese, meat, fish, sugar, pilot biscuits and chocolate remained unchanged. No foods containing appreciable amounts of water were included.

It was not until more than six million parcels had been shipped that an opportunity presented itself to interview and examine men from the internment camps and thus obtain firsthand information on the acceptability of the Canadian Red Cross food parcel. In November, 1943, approximately 100 Canadian Army and R.C.A.F.

TABLE I.
AMOUNTS OF DIFFERENT ARTICLES OF FOOD AND THEIR CALORIC VALUE
CANADIAN RED CROSS FOOD PARCEL

Food	Weekly amount (oz.)	Daily amount (oz.)	Calories per day
1. Whole milk powder	16	2.3	380
2. Butter	16	2.3	486
3. Cheese	4	0.57	61
4. Corned beef	12	1.7	106
5. Pork luncheon meat	10	1.4	131
6. Salmon	8	1.14	111
7. Sardines or kippers	4	0.57	
8. Dried apples	8	1.14	96
9. Dried prunes	8	1.14	
10. Sugar	8	1.14	128
11. Jam	16	2.3	160
12. Pilot biscuits	16	2.3	291
13. Eating chocolate.	8	1.14	120
14. Salt and pepper.	1	0.14	—
15. Tea	4	0.57	—
16. Soap	2	0.28	—
Total			2,070

personnel who had just been repatriated from Germany were seen. The nutritional condition of the men was excellent and they spoke most favourably of the Canadian parcel. The findings were reported in 1944.[2]

Scope and method of study.—It was evident that a concerted effort should be made to determine how successful the parcels had been in meeting their objective and to learn of any deficiencies or defects so that appropriate improvements could be made in any parcels to be provided in the future. Accordingly plans were made to interview prisoners-of-war immediately on their repatriation to Great Britain. A special enquiry form was prepared for the purpose and four of the authors (M.W., J.M., N.G. and G.R.) proceeded to England early in 1945 for the purpose of obtaining the desired information.

Arrangements were made with the British and Canadian military authorities to interview the men as soon as possible after their return to England. The great majority of the men were seen *before* proceeding on leave.

In conducting the study it was found that the most satisfactory method was to interview the men in groups and to cover the enquiry form question by question; this method was employed to a large extent. Every effort was made to ensure that the replies were unbiassed and the men were not permitted to discuss the questions with each other before recording them on the enquiry form. The co-operation of the men was excellent throughout and the general quality of the recorded information good.

In all, 6,551 men were satisfactorily interviewed and the completed questionnaires were returned to Canada for tabulation (Table II).

TABLE II.
NUMBER OF PERSONNEL INTERVIEWED

Force	Number
British Army	2,585
Canadian Army	1,740
Royal Canadian Air Force	845
Australian Army	546
Royal Air Force	462
Royal Navy and Marines	299
Royal Canadian Navy	74
Total	6,551

The information on the enquiry forms was coded and punched into specially designed Hollerith cards. The facilities of the R.C.A.F. Institute of Aviation Medicine, Toronto, were used in coding, punching, and tabulating the data. In view of the large amount of information available on the forms and the rather extensive tabulations required, the analysis was limited to the three largest groups of men—British Army (2,585), Canadian Army (1,740) and Royal Canadian Air Force (845). These three groups comprise 78.8% of the total.

Thirty-five tabulations were prepared for each of the three groups of personnel. These tables afford data on the age of the prisoners-of-war, the nationality, racial origin, residence, education, rank, theatre in which taken prisoner-of-war, the number of months a prisoner, the camp at which most time was spent, the percentage of type of food parcel received (British, American, Canadian, New Zealand, etc.), the number of food parcels received (per week), the adequacy of food with and without the food parcels, spoilage of indi-

vidual items of food in the parcel, the preference for food parcels, the expressed preference for particular food groups and the preference for individual foods within the different food groups in relation both to racial origin and place of residence. Data on hospitalization and the drinking of milk were also tabulated.

Some of this information is of general interest and it was therefore decided to prepare a brief final report on the Canadian Red Cross Prisoners-of-War Food Parcel for publication.

General characteristics of the group.—86% of the 5,170 prisoners-of-war for whom the data were tabulated were interviewed before proceeding on leave (British Army 84%, Canadian Army 99%, and R.C.A.F. 66%). The vast majority of the men were under 30 years of age; only 14% of the R.C.A.F. personnel, 21% of the Canadian Army personnel, and 31% of the British Army personnel being over this age.* Most of the men included in the study were from prison camps located in Germany and Italy.

The length of time spent as a prisoner-of-war varied from a few weeks to more than five years. The British Army personnel were prisoners-of-war for the longer periods, over half of them being prisoners-of-war for more than three years, and no less than one-third for about five years. Over half of Canadian Army personnel were prisoners-of-war for less than one year, and one-third for over two and a half years. Two-thirds of the R.C.A.F. personnel were prisoners-of-war for over one year and 30% for over two years.

Seventy-six per cent of the men from the British Army were English, 13% Scottish, 6% Welsh and 3% Irish. In the Canadian Army, 70% were of British descent and 17% of French descent, while in the R.C.A.F., 79% were of British descent and 6% of French descent. The R.C.A.F. personnel were all officers or senior non-commissioned officers, while only about 10% of both the British and Canadian Army personnel were of these ranks; 66% of the men from the R.C.A.F. had junior or senior matriculation (or equivalent) or university education, compared with 11% in the Canadian Army and 5% in the British Army.

Distribution of parcels.—Three main groups of Red Cross food parcels were received by the men surveyed, the British, the American and the Canadian, with a smaller number coming

(Photograph by Associated Screen News Ltd., Montreal)

Fig. 1.—Contents of Canadian Red Cross prisoners-of-war food parcel.

* All of the percentages in this report have been computed excluding the cases for which no information was available (questions not answered, or record ambiguous).

from New Zealand and other countries. The men were asked to record an estimate of the percentage of each type of parcel received. These figures indicated that R.C.A.F. personnel received on the average more American parcels (40%) than either British (26%) or Canadian parcels (29%). The Canadian Army figures showed that they received more British parcels (39%) than others, with about 31% Canadian and 24% American parcels. The British Army received British parcels in the majority (44%) with Canadian parcels (37%) a close second and relatively few American parcels (11%).

It was the objective to make available one food parcel per prisoner-of-war per week. The International Committee of the Red Cross did a remarkably fine job of distribution, but due to many circumstances beyond their control, the objective of one Red Cross Food Parcel per man per week was not attained. The replies to the question "How often did you receive food parcels while a P.O.W.?" indicated that 17% of the group received on the average less than one-half food parcel per week; 20% received one-half parcel, 31% received somewhere between one-half and one parcel; and 32% received one parcel per week or more.

Adequacy of food parcels.—The first question to be answered is, "Were the food parcels really needed?" Only 62 men, or approximately 1%, stated that they had enough food without the Red Cross parcels. More than two-thirds (69.4%) of all men reporting stated that they would not have had enough food without Red Cross food parcels. A further group of 29.4% stated in fact that even with the parcels they did not get enough to eat. Hundreds of the men stated that they could not have lived without the parcels.

Of the men who received one food parcel per week, 18% of R.C.A.F., 17% of British Army and 24% of Canadian Army personnel stated that they still did not receive enough food. Taking all groups together, only 19% rated their diet as poor when receiving one parcel per week. It is of interest that only 8% of the British Army, 10% of the Canadian Army and 10% of the R.C.A.F. personnel reported a weight loss of 20% or more. Indeed, 58% of the Canadian Army, 68% of the British Army, and 58% of the R.C.A.F. personnel reported either no loss of weight or a loss of less than 10% of their usual weight.

Parcel preference.—The questionnaire sought an expression of individual opinion as to the type of parcel which was preferred. The answers to this question might possibly be affected by the proportion of the total food parcels received which were of any one type. It is not considered that this or any other factor materially affected the recorded data.

In reply to the question "Which parcel did you prefer? (designate as 1, 2, 3, 4, 5) U.S. ...., Br. ...., Can. ...., N.Z. ...., other ....?" 82% of the R.C.A.F., 82% of the Canadian Army and 71% of the British Army gave first preference to the Canadian parcel. This expressed preference was supported in the majority of cases by such statements as "greater bulk", "lasted longer", "more food", etc., and by reference to specific items which were specially appreciated or preferred.

Individual food preferences.—The men were asked to record on the form the items in the

TABLE III.

LEADING ITEMS ACCORDED SPECIAL PREFERENCE

Food	*British Army*	*Canadian Army*	*R.C.A.F.*	*Total men giving first preference*
Net number of men reporting	*2,108*	*1,361*	*773*	*4,242*
Biscuits	420	286	162	868
Butter	424	281	142	847
Meat	445	220	93	758
Milk, powdered	125	96	123	637
Milk, other	156	92	45	
Chocolate	165	142	107	414
Cigarettes	53	154	34	241
Tea	216	21	2	239
Jam, marmalade	8	25	18	51
Cereals	22	5	14	41
Cheese	18	6	5	29
Coffee	7	12	6	25
Other items	49	21	22	92

various types of parcel received which they especially appreciated or preferred. In many instances, several items were recorded, in some just two or one; in a fair number of cases (18%) the question was not answered. When the totals for all recorded preferences are summed, they tally closely with the figures for the first item recorded in each case (referred to as the first preference) and it is to these latter data that reference is now made.

The leading food items among those recorded as specially appreciated or preferred by the men of each of the three Services, are set out in Table III.

In planning the Canadian food parcel special biscuits made largely out of white flour were included in the belief that the men would not receive any white flour and would use these biscuits with the butter, jam, meat and cheese. It is of particular interest therefore that the individual item which was recorded as especially appreciated by the greatest number of all the men was these biscuits. Butter was a close second. Of the three leading types of parcel, the Canadian parcel was the only one to contain butter, both the British and American parcels containing margarine. The article given first preference by the next largest number was milk in the R.C.A.F. and meat in the British and Canadian Armies. Chocolate was another food item given quite a high rating.

Cigarettes, which were not included in the Canadian parcel, were highly prized and were recorded first among preferred items by 241 men. Tea was accorded first preference by 216 men in the British Army but by a negligible number in the Canadian Army and R.C.A.F. Coffee was not particularly prominent as a preferred item in any Service. Other articles in the parcels were not given particular mention in any large number.

Food dislikes.—An attempt was also made in the study to secure an expression of the attitude toward or the preference for the general food groups represented in the food parcels. The men were asked to indicate this by using the terms "like", "indifferent," "dislike". In Table IV is set out the number of men who recorded "dislike" for different food groups.

It is most gratifying that out of the 5,170 men interviewed in the three Services, only nine expressed a dislike for milk. From the standpoint of the Canadian parcel, fish was the only food group for which a "dislike" was expressed by any large number of men (13.5%). When the Canadian parcel was being planned it was realized that fish would not be as well liked as meat but it was included in addition to meat in order to give as high a content of animal protein as was practicable.

Food group preferences. — Information was also sought on the specific preferences for different foods within the various food groups and a substantial portion of the enquiry form was devoted thereto. Each person was asked to record the order of his preference (1, 2, 3, 4) for individual items within food groups. The first preference for individual food items within food groups are summarized in Table V.

TABLE IV.
FOOD GROUPS RECORDED AS DISLIKED

Food	Number who expressed dislike		Total who expressed an opinion
	Number	Per cent	
Vegetables*	673	15.5	4,347
Fish	638	13.5	4,732
Condiments	264	6.0	4,404
Egg powder	168	3.7	4,508
Dried fruit	150	3.2	4,740
Cereals	121	2.6	4,734
Fat	86	1.9	4,576
Cheese	79	1.7	4,565
Desserts	71	1.5	4,554
Sweets	58	1.2	4,786
Beverages	44	0.9	4,751
Jams	40	0.8	4,769
Biscuits	20	0.4	4,664
Meat	11	0.2	4,865
Milk	9	0.2	4,762

*Peas, dried.

In the meat group, British Army personnel gave first preference to bacon in the greatest number of cases (49.3%) while corned beef and pork luncheon meat ranked equally in second place. In the two Canadian services, pork luncheon meat was most frequently given first preference, with corned beef second and bacon third. In all Services, salmon was the fish of choice; in the British Army pilchards were a close second and sardines a not too distant third; in both the Canadian Services sardines were a very poor second and pilchards an even worse third. Butter was preferred to margarine by 97.4% of all personnel. Dried milk was accorded a sharp preference over sweetened condensed milk by both Canadian Services, while the British Army personnel recorded a slight preference for the sweetened condensed type. Of the dried fruits, raisins were given first preference in 80% of cases. Men in the British Army indicated a very strong prefer-

ence for tea while Canadian Army personnel had an almost equal preference for tea and coffee; coffee was the first preference two to one among R.C.A.F. personnel. In the "sweets" group, chocolate was predominantly the first choice, and sugar a poor second; only a very small number preferred candy. Jam was preferred by all groups to honey or syrup. Among British Army personnel, creamed cereal was given first preference in the greatest number of cases in the cereal group, with rolled oats and oatmeal second and third choice. In both Canadian Services, rolled oats and oatmeal shared top preference equally, a considerably smaller number preferring creamed rice. In the dessert group, a majority of the British Army men preferred "pudding" to pancake batter by a slight margin, while pancake batter was preferred by a substantial majority of Canadian personnel.

Spoilage.—The only item that caused any concern from the standpoint of spoilage in the Canadian parcel was cheese, 22.8% of the men receiving these parcels reporting spoilage. This was a processed or cream cheese. It was realized that a processed cheese tin-foil wrapped would probably not keep over a period longer than one year, but it was anticipated that the parcels would be distributed and consumed long before this time. In 1943, it was first learned that the cheese in some of the

TABLE V.

FIRST PREFERENCES FOR SPECIFIC FOODS

Food groups and items		R.C.A.F. Percentage	Canadian Army Percentage	British Army Percentage	Total Percentage
Total number of reports		*845*	*1,740*	*2,585*	*5,170*
Meat	Bacon	17.2	17.7	49.3	34.1
	Corned beef	22.0	23.4	18.7	20.7
	Liver paste	0.8	2.2	0.7	1.2
	Meat, cold	6.1	5.2	2.5	4.0
	Meat, hot	9.1	3.8	4.2	4.9
	Tomato sausage	0.6	0.7	1.1	0.9
	Pork luncheon	38.2	42.1	18.2	28.9
	Sausages	6.0	4.9	5.3	5.3
Fish	Pilchards	9.4	10.4	35.6	23.3
	Salmon	74.6	70.5	45.3	58.2
	Sardines	16.0	19.1	19.1	18.5
Fat	Butter	98.0	98.0	96.7	97.4
	Margarine	2.0	2.0	3.3	2.6
Fruit	Dried	10.5	5.2	10.3	8.7
	Prunes	3.8	5.9	5.8	5.5
	Raisins	84.0	83.2	77.3	80.4
	Orange concentrate	1.7	5.7	6.6	5.4
Sweets	Chocolate	73.3	78.4	81.2	78.9
	Sweets	1.3	1.6	1.5	1.5
	Sugar	25.4	20.0	17.3	19.6
Cereal	Creamed rice	14.9	27.5	44.9	34.2
	Oatmeal	40.4	34.7	21.8	29.1
	Oats, rolled	44.7	37.8	33.3	36.7
Beverage	Cocoa	23.8	16.7	8.4	13.7
	Coffee	51.3	43.0	7.2	26.2
	Tea	24.9	40.3	84.4	60.1
Milk	Condensed sweetened	14.1	28.2	52.0	37.8
	Dried	85.9	71.8	48.0	62.2
Jams	Jam	71.8	64.3	74.9	71.1
	Syrup	3.3	6.5	8.6	7.0
	Honey	24.9	29.2	16.5	21.9
Condiments	Mustard	52.9	48.4	64.4	57.6
	Condiments	47.1	51.6	35.6	42.4
Desserts	Pancake Batter	65.1	61.1	47.8	54.9
	Puddings	34.9	38.9	52.2	45.1

parcels had spoiled. From 1944 on the cheese in the Canadian parcel was tinned.

In the British parcel meat and chocolate were the food items of note in which some spoilage was reported—5.3 and 6.6% of men receiving this parcel reporting such spoilage. Very little spoilage of any sort was reported in the American parcel. The only item of any frequency was cheese—3.7% of the men receiving this parcel reporting some spoilage.

SUMMARY

1. From January, 1941, until the end of the war the Canadian Red Cross packed and shipped nearly 16½ million prisoners-of-war food parcels at a cost of $47,529,000.

2. In an attempt to determine the reaction of Canadian and British prisoners-of-war in the European theatre of operations to Red Cross food parcels, 6,551 men were interviewed shortly after their return to Great Britain. Many were seen within 24 hours of release from prison camp.

3. Some of the essential data recorded on a special enquiry form by 845 Royal Canadian Air Force, 1,740 Canadian Army and 2,585 British Army personnel, are presented.

4. The food parcels received by the men interviewed had been largely packed by the British, Canadian and American Red Cross Societies, with a smaller number from New Zealand and other countries.

5. The International Committee of the Red Cross did a remarkably fine job of distribution, but due to many circumstances beyond their control, the objective of one Red Cross food parcel per man per week was not attained; 17% of the men reported that they received on the average less than one-half food parcel per week; 20% received one-half parcel per week; 31% received somewhere between one-half and one parcel and 32% received one parcel per week or more.

6. Of the 5,170 men interviewed, only 62, or 1.2% stated that they had enough food without the Red Cross food parcels. More than two-thirds (69.4%) stated that they would not have had enough food without the Red Cross food parcels. A further group of 29.4% stated in fact that even with the parcels they did not get enough to eat. Of the men receiving one food parcel per week, only 19% rated their diet as poor.

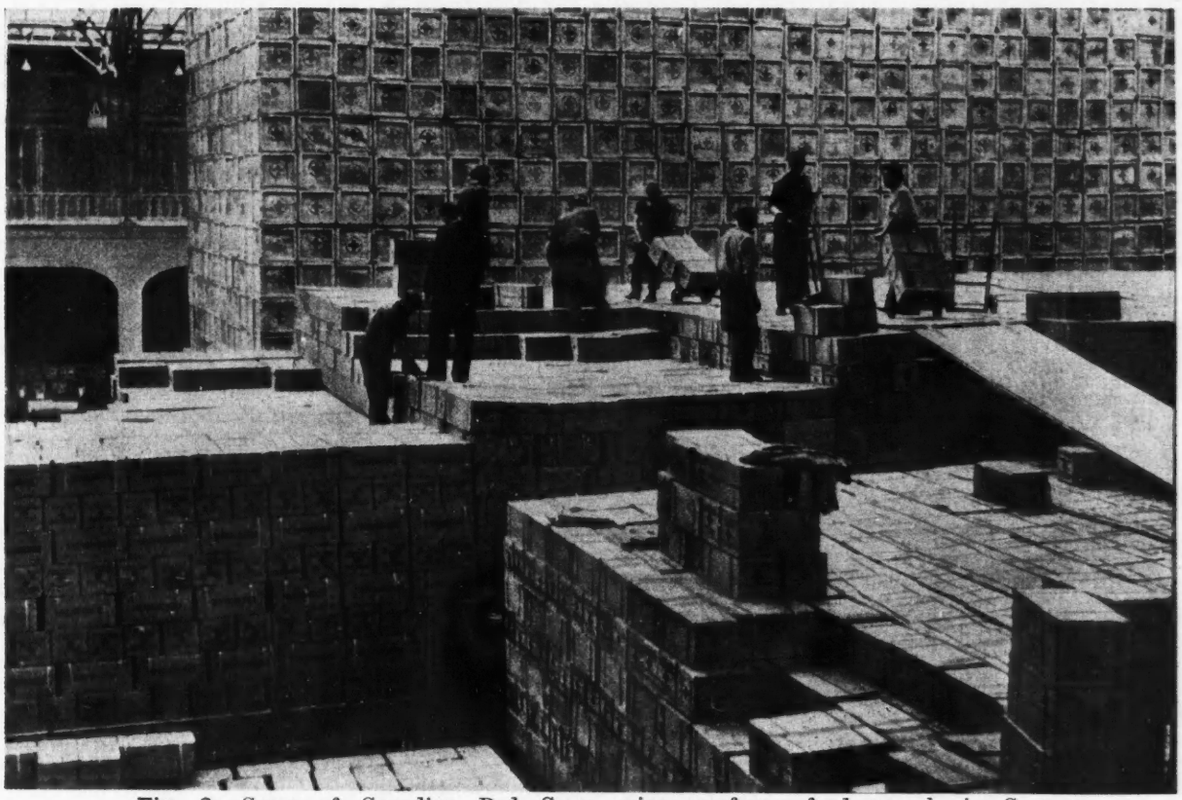

Fig. 2.—Cases of Canadian Red Cross prisoners-of-war food parcels in Geneva, Switzerland. More than 13 million Canadian parcels passed through this warehouse.

7. Eighty-two per cent of the R.C.A.F., 82% of the Canadian Army and 71% of the British Army personnel gave first preference to the Canadian Red Cross food parcel.

8. The food items most frequently reported as especially appreciated were biscuits, butter, meat, milk and chocolate in order.

9. Out of the 5,170 men only 9 expressed a dislike for milk, 11 for meat and 20 for biscuits. The only food in the Canadian parcel for which an appreciable number expressed a dislike was fish.

10. Considering the specific food preferences, in the meat group British Army personnel gave first preference most frequently to bacon, while in the Canadian Services, pork luncheon meats was most frequently given first preference. In all Services, salmon was the fish of choice. Butter was preferred to margarine by 97.4% of all personnel. Dried milk was sharply preferred to sweetened condensed milk by both Canadian Services, while the British Army personnel recorded a slight preference for the condensed type. Chocolate was the first choice in the "sweets" group.

11. The Canadian Red Cross food parcel accomplished its purpose of supplying food that was of high nutritional value in an acceptable form.

12. This paper merely presents some of the highlights. Detailed tabulations have been made and will be available through the Canadian Red Cross Society, 95 Wellesley Street, Toronto. All original enquiry forms and punched cards are held on file by the Medical Statistics Section, R.C.A.F. Institute of Aviation Medicine, Toronto.

The Canadian Red Cross Society desires to express its appreciation to the Medical Branch of the Royal Canadian Air Force for the preparation of the questionnaire and to the Institute of Aviation Medicine for the tabulation of the results.

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Erratum

The abstract on "The Surgical Treatment of Carcinoma of the Hypopharynx and Œsophagus" in February, 1949, was based on the article written by Dr. Harold Wookey, *Brit. J. Surg.*, 35: 249, 1948.

PRELIMINARY REPORT ON CLINICAL TRIALS OF ANTABUSE

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ANTABUSE is the Danish trade name for tetraethylthiuramdisulphide. Patients receiving this drug have an abnormal reaction to alcohol in the body. This drug itself has few effects when administered in daily doses of 0.5 gm. (7½ gr.) over a period of several months.[1]

The symptoms produced by alcohol after administration of antabuse are probably due to interference with the oxidation of alcohol so that abnormally high levels of acetaldehyde are produced in the body.[2] All the effects of alcohol after antabuse can be duplicated by continuous intravenous infusion of acetaldehyde.[3] The Danish investigators, with whom we have had much correspondence in the last month, give this drug to co-operative alcoholic patients who wish it as a reinforcement to their resolution to maintain a prolonged period of sobriety. This period of sobriety is used to institute the mental, physical, social and spiritual adjustments necessary for complete rehabilitation of the chronic alcoholic.

At the request of the Canadian Medical Association we are submitting for consideration at this time, our initial experiences with the drug since it has recently been made available in Canada on medical prescription.

It is much too early to assess the value of antabuse in the entire treatment of the chronic alcoholic. Our report here is mainly concerned with the symptoms produced when alcohol is taken after antabuse.

In general, our experiences confirm those of Dr. Jacobsen and his associates in Denmark. However, several additions to their findings will be noted, even in this small series.

Hald *et al.*[1] reported no marked symptoms attributable to antabuse itself. In our series of nine cases, five have reported mild transient gastro-intestinal upsets consisting of tenesmus and mild diarrhœa. Four have noted unusual fatigue; three have remarked on an unpleasant

breath and one of these noted a garlic-like taste. No severe symptoms have occurred in the patients who have received 0.5 gm. antabuse daily for a period of a week to ten days in the absence of alcohol.

Dr. Jacobsen in a private communication described the effects of antabuse and alcohol as "formidable". The symptoms which have been recorded by Hald, Jacobsen, Larsen[1] after the patient has been sensitized to alcohol with 1 gm. of antabuse the previous day, are briefly summarized as follows.

> Five to ten minutes after ingestion of *moderate amounts of alcohol* (20 gm. of ethyl alcohol, equivalent to 2 oz. of whiskey) the individual has a sensation of heat in the face which is accompanied by an intense flushing. The face, scleræ, upper limbs and chest become intensely red. At the same time an intense pulsation is felt in the head and neck, sometimes accompanied by a throbbing headache. The pulse is accelerated (120 to 140 per minute). Most cases complain of slight constriction in the neck and some of subjective dyspnœa or more frequently of a mild irritation in the throat or trachea which results in slight coughing. These symptoms reach maximal intensity in approximately one-half hour after taking alcohol.
>
> *After larger doses of alcohol* (40 to 50 gm. of ethyl alcohol) nausea may begin 30 to 60 minutes after the onset of the cardiovascular symptoms and the intense flushing may be replaced by pallor. A considerable fall in blood pressure may occur; *e.g.*, to 65 mm. Hg. systolic, while the diastolic pressure may fall to zero.
>
> The nausea results in copious vomiting in some cases. Apart from these symptoms a general uneasiness is felt which is very disagreeable to the patients. *The intensity and duration of the symptoms depend on the dose of alcohol and the disposition of the individual.* These symptoms are produced after ingestion of every kind of alcoholic beverage and even after pure ethyl alcohol diluted with distilled water. The duration of the symptoms varies from 30 to 60 minutes in the slight cases, to several hours in the more pronounced ones. When the symptoms begin to fade, the patient generally feels exhausted and sleepy but after a few hours of sleep, he feels completely well again.

Dr. Jacobsen recommended that any physician considering the administration of antabuse to his alcoholic patients should first try the effects of antabuse plus alcohol on himself. Accordingly, the first trial was conducted with the authors as subjects, on January 29, 1949. After taking antabuse (0.5 gm. daily for 4 days), alcohol was administered and the effects were observed by Dr. J. K. W. Ferguson and Dr. G. H. W. Lucas, Professors of Pharmacology, University of Toronto; Dr. J. G. Dewan, Assistant Professor of Psychiatry, University of Toronto and Dr. A. Miller, Toronto Psychiatric Hospital.

The authors experienced the symptoms outlined by Hald *et al.*[1] with some additions. In one case, the peripheral vascular collapse was both subjectively and objectively much more marked than expected from the small dose of alcohol taken. On three occasions no pulse was detectable at the wrist when the subject stood up. At this time blood pressure in the supine position was 118/50, and the pulse 132. On standing up, the pulse rate rose to 144 for about one minute, then the rate suddenly decreased to about 70 per minute, and rapidly became impalpable. In both subjects the oral temperature fell to 97°. No nausea or vomiting occurred. The venous blood alcohol concentration at the height of symptoms was 25 mgm. per 100 ml. in each case. Recovery was delayed for five hours longer than expected in one case, with severe throbbing headache and an inability to remain erect due to a sensation of impending collapse; and three hours longer than expected in the other case.

Three alcoholic patients given measured amounts of alcohol (1½ to 3 oz. of whiskey) calculated to give a maximum concentration of alcohol in the blood of 40 mgm. per 100 ml., showed symptoms almost identical with those reported by Dr. Hald.[1] The venous blood alcohol concentration in one of these patients was found to be 39 mgm. per 100 ml. at the height of symptoms.

Additional phenomena encountered with the remaining four patients deserve special mention. The first, weighing 185 lb., requested more alcohol than was offered as an initial dose. It had been his consistent custom to begin an alcoholic bout by drinking two glasses of undiluted whiskey rapidly one after the other. He was allowed to drink 2 oz. of whiskey initially. Additional 1½ oz. doses were allowed half hour and one hour later at the insistence of the patient who showed only mild effects at this time. The total intake, over the period of one hour, was 5 oz. of whiskey. Even this amount was only about one-third of the alcohol that he would ordinarily have consumed within the first fifteen minutes had he been allowed to drink it at his own rate, which is the procedure recommended by Martensen-Larsen.[5] Ten minutes after taking the last dose of whiskey, his breathing became progressively slower and within one minute ceased altogether. Breathing was reestablished through the use of artificial respiration and oxygen, but the respirations remained slow for the next 30 minutes, at which time he commenced to vomit. At this time the measured venous blood alcohol concentration was 62 mgm.

per 100 ml. He vomited repeatedly for the next four and one-half hours. Asmussen *et al.*[4] have reported rapid, deep respiration accompanied by decrease in alveolar CO_2 tension to be the usual change in respiration but has not reported cessation of respiration. The following day, the patient stated that no previous hangovers, some of which included delirium tremens, approached in intensity the effect of the 5 oz. of alcohol ingested following the administration of antabuse.

Only the milder symptoms developed in another patient who drank beer and was extremely cautious to avoid sufficiently rapid intake of beer to produce the more serious phenomena experienced by the previous patient. It was later revealed that he had not consumed his beer at his usual rate and when he consumed 2 oz. of whiskey in the latter part of his test, severe symptoms, including vomiting, resulted. The venous blood concentration of alcohol at this time was 32 mgm. per 100 ml.

In contrast with the slow development of symptoms noted above, another patient, tested with 24 oz. of beer ingested within 5 minutes, developed the entire syndrome as rapidly as those tested with whiskey. His alcoholic intake was equivalent to 3 oz. of whiskey.

These experiences illustrate that the factors concerned in the rate of accumulation of alcohol in the blood appear to be partly responsible for the severity of symptoms developed when a certain quantity of alcohol is administered to a patient who has previously received antabuse.

The fourth case developed severe migraine-like headaches that persisted for approximately 12 hours after ingestion of alcohol.

Administration of oxygen in one case seemed to benefit the patient but it must be emphasized that no means of controlling the severity of the reaction once established has yet been devised.

We do not give antabuse until we know that the patient is free of alcohol. There is reason to believe, from an accident reported in the Danish press, that serious consequences are to be expected if antabuse is taken while there are appreciable amounts of alcohol in the body. We believe that it would be extremely dangerous to give antabuse to any person under the influence of alcohol. It should not be given to "sober up" an alcoholic. These persons may have in their blood, concentrations of alcohol up to 400 mgm. per 100 ml.

It is our considered opinion that antabuse will prove valuable as an adjunct in the treatment of the alcoholic patient but should be used for some time to come, only on carefully selected patients, with a full realization of its potential dangers.

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CASE REPORTS

CYANOSIS IN INFANTS DUE TO HIGH NITRATE CONTENT IN WATER

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The following two cases seem worthy of being added to those already recorded.[1, 2]

Baby M.C., was born in hospital on May 12, 1947, being the fourth child in the family. The birth weight was 3,620 gm. and labour uneventful. Previous three children had been nursed for two to five months, but all of them had required supplementary feedings. This last child was not breast fed at all but was put on powdered milk (S.M.A.) formula.

Mother and child were discharged on the 10th day, the child gaining weight and appearing entirely normal. It was brought back to the hospital four days later because of cyanosis, which had developed in the previous two days. Its colour was a grayish-blue and the dark colour seemed increased on crying. The findings were entirely negative except that the heart shadow in x-ray film was thought to be slightly broad at the base. The cyanosis had disappeared after twenty-four hours in hospital and the child was discharged. The possibility of a congenital heart lesion was considered.

This child was readmitted after one day at home, again being deeply cyanosed. At this time the babe was referred to a pædiatrician in the city, the report from whom was as follows:

1. Cyanosis, aggravated by crying.
2. Heart rapid and enlarged.
3. Liver and spleen enlarged.

Diagnosis.—Congenital heart, probably tetralogy of Fallot (murmurs will probably appear if the infant survives).

Prognosis.—Bad.

The child was readmitted to hospital and cyanosis again gradually cleared up, being all gone in about 48 hours. Repeated x-ray films showed a heart shadow that was only questionably enlarged. We were never able to demonstrate enlargement of liver or spleen. The child was discharged at 8 weeks of age and thereafter had only occasional and slight cyanosis: all the time the child was being fed on the S.M.A. powder. It had a steady gain and at one year weighed 26 lb. It was considered to have a congenital heart that had somehow not followed the usual course. The only possible abnormal finding was that the cardiac shadow might be considered large.

Another child was born to the mother on August 24, 1948, and its history was remarkably similar to the one described above; normal easy labour, weight 3,640 gm.; placed on S.M.A. powder feedings and was well until after about five days at home, when it was brought to hospital having gradually become cyanosed during the day with no obvious reason. The mother stated she had read an article in one of the popular magazines to the effect that sometimes "blue babies" were caused by well water used in making up their feedings. *She* suggested that she use *distilled water* in making up the feeding as she was suspicious of their well water. This was done and the cyanosis cleared up in about 24 hours. After a short time the well water was again used for making up the feedings. After a few days the cyanosis again appeared, and disappeared when the well water was discontinued.

In the subsequent analysis of this well water the report was as follows:

"Nitrites, 9.5 parts per million; nitrates, 190 parts per million. Both the chemical and bacteriological results show evidence of contamination by animal organic matter. We regard this water as unfit for consumption by humans. Even though boiled it should not be used for infants because of the large content of nitrate."

COMMENT

1. In the case of the first infant the correct diagnosis, *viz.*, methæmoglobinæmia, was missed entirely, the physician in charge not having heard of the condition at all and of course having the opinion of the consultant pædiatrician that the case *was* one of congenital heart disease.

2. The mother and all concerned had many months of needless anxiety regarding the infant's heart.

3. The condition seemed to clear up spontaneously shortly after two months of age.

4. The condition should always be thought of in a case of cyanosis in a young infant where well water is used in making up the formula.

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INTRAVENOUS PROCAINE HYDROCHLORIDE TREATMENT OF PENICILLIN SENSITIVITY REACTION SIMULATING SERUM SICKNESS*

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Reactions to penicillin therapy simulating serum-sickness have been frequently observed.[1, 2] The anti-histamine drugs have provided an effective therapeutic aid in the management of serum sickness following serotherapy[3] as well as in the closely allied clinical entity which may follow the use of penicillin.[4] In 1946, State and Wangenstein[5] reported on the successful use of procaine hydrochloride intravenously in the treatment of true serum sickness. Shortly thereafter Appelbaum *et al.*[6] published a confirmatory case report. In 1947, Dressler and Dwork[7] faced with a "serum sickness-like" reaction (following penicillin therapy) which was responding inadequately to benadryl obtained a good therapeutic response following the use of procaine hydrochloride intravenously. We would like to present the following case report which well illustrates penicillin "serum sickness" and which was successfully treated with procaine hydrochloride intravenously following therapeutic failure of the antihistamine drugs.

The patient, G.E., a 25 year old white male was admitted to the Infirmary, October 22, 1948, complaining of sore throat, severe pain in all his joints (ankles, knees, thighs, wrists, elbows, shoulders) and intense generalized itching associated with a rash over the entire skin surface.

Except for an attack of "tonsillitis" in 1943, the patient had enjoyed good health all his life. Two weeks prior to admission he had received successful penicillin

* Verdun Protestant Hospital.

therapy (one million units of aqueous penicillin parenterally) for several large furuncles on the legs. He remained perfectly well until four days prior to admission when he presented himself with complaints of "two large itching lumps" on his head and a "very itchy" skin rash which he describes as "red blotches". He was given benadryl, 50 mgm. t.i.d. and h.s. and although he took his medication faithfully, his condition steadily grew worse and he was finally admitted to hospital.

Physical examination revealed a well nourished, healthy, white male in obvious distress, hardly able to restrain himself from scratching his skin. Blood pressure 110/60, pulse 124, temperature 101.6°. The pharynx and tonsillar fossæ appeared normal despite patient's complaints of sore throat. No adenopathy was noted anywhere, the spleen was not palpable. Heart and lungs were normal to percussion and auscultation. Central nervous system normal. Almost the entire skin surface including scalp and face was covered by large urticarial patches which in many places were coalescent so that the lesions varied in size from 2 or 3 cm. in diameter to 10 or 12 cm. In many places especially on the scalp, œdema was a prominent feature. On examination of the joints, no effusion was noted but the periarticular tissues everywhere were very tender to palpation. This clinical picture was interpreted as a delayed sensitivity response to penicillin therapy.

Laboratory findings.—Hgb., 100%. White blood cells, 13,250 and 14,500 on two successive days. Sedimentation rate, 60 mm. Differential: polymorphonuclears 55%, leucocytes 40%, monocytes 4, eosinophiles 1, urine, only normal findings. Patient had been receiving benadryl, 50 mgm. t.i.d., p.c. and h.s. for four days. On admission, pyribenzamine 100 mgm. t.i.d., p.c. and h.s. was ordered. Since there was little response to this within 48 hours, aqueous adrenaline (subcutaneously) and oral ephedrine hydrochloride were also administered. Local antipruritics were of little avail but calcium gluconate 1.0 gm. intravenously gave subjective relief for several hours and several such doses were administered within the next week or so.

None of the above therapeutic agents seemed to affect the patient's condition. He remained febrile. It was noted that the skin lesions were evanescent in character and a changing picture was manifest, lesions appearing, disappearing and reappearing. Striking dermographism was observed. Forty-eight hours after admission it was noted that the arthralgia had become much more severe. There seemed to be considerable fusiform swelling about the metacarpo-phalangeal and interphalangeal joints, about the elbow, and even about the toes. The patient was in severe pain (morphine was necessary) and was forced to remain motionless in bed. He also complained of great difficulty in starting the urinary stream. Repeated urinalyses revealed no abnormal urinary constituents and urinary output was excellent. Five days after admission patient complained of neck stiffness and pain. Examination of the nervous system was difficult because of the arthralgia but no Kernig or Brudzinski signs could be demonstrated.

Lumbar puncture was performed. The cerebrospinal fluid was not under increased pressure. There were 15 cells/cu.mm. which on smear were seen to be lymphocytes. Pandy, negative. Wassermann, negative. Biochemical studies showed slightly elevated proteins, but chlorides and sugar were normal.

Eight days after admission the patient's condition was essentially unchanged. He continued to complain of sore throat but nothing could be seen on examination. The most distressing symptom was the generalized arthralgia which involved even the temporomandibular joints, so that chewing was painful. The patient was seen by a consultant and it was decided that intravenous procaine should be tried. Accordingly, procaine hydrochloride, 1.0 gm. dissolved in 500 c.c. of normal saline, was administered by continuous intravenous drip. The solution was run in slowly over a two-hour period. Twenty minutes after the infusion was begun, patient volunteered that his arthralgia was considerably eased. This was not unexpected since procaine is a well-known anæsthetic agent. The following morning patient was considerably brighter, his lower limbs were completely free of pain and he was able to move them briskly about. He did have some arthralgia in his fingers and the left shoulder joint but reported that the pain was much less intense. The following day another intravenous infusion of procaine was administered because of persistent mild arthralgia in the hands. There was marked relief. The patient's temperature returned to normal and convalescence was rapid thereafter. He was discharged one week after the first infusion of procaine hydrochloride and returned immediately to work.

There is no adequate explanation for the above described effect of procaine hydrochloride The authors already referred to state that its intravenous use is not usually attended by serious toxic reactions. If given too quickly, flushing, dizziness, and generalized numbness are complained of. This was noted in the case reported above but simply slowing up the rate of drip promptly abolished these symptoms. Undue procaine sensitivity, according to the authors, manifests itself by signs of cortical stimulation as convulsions. This is readily controlled by intravenous sodium amytal. Theories attempting to explain the therapeutic action of procaine, as here described, refer variously to: (1) the similarity in the chemical structure of procaine and benadryl and thus an antihistamine effect; (2) "direct action on cells"; (3) an anti-acetylcholine action and (4) potentiation of adrenaline response.

SUMMARY

1. Penicillin sensitivity responses which simulate serum sickness are not uncommon.

2. The antihistamine drugs are effective in the treatment of both "penicillin serum sickness" following serotherapy.

3. Procaine hydrochloride intravenously has been successfully used to treat various forms of serum sickness including that following penicillin therapy.

4. A case is presented illustrating penicillin serum sickness which responded inadequately to antihistamine therapy and was successfully treated by intravenous procaine hydrochloride.

Special thanks are due to Dr. R. C. Bennetts who saw this case in consultation and encouraged this report; and to Dr. G. E. Reed, Medical Superintendent, for permission to publish.

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AN UNUSUAL SIGN ASSOCIATED WITH AORTIC INSUFFICIENCY, WITH REPORT OF A CASE

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The patient described below exhibited a panting type of breathing, which was first noticed by himself and subsequently brought to the attention of his physician.

Several current and less recent published textbooks in medicine, cardiology, and physical diagnosis, were searched without finding reference to this unusual sign. The pertinent findings and the interpretation were considered to be worth reporting.

History.—H.E.S., male, white, age 40. No serious childhood diseases or sequelæ were recalled and the patient was always active and able to take part in most

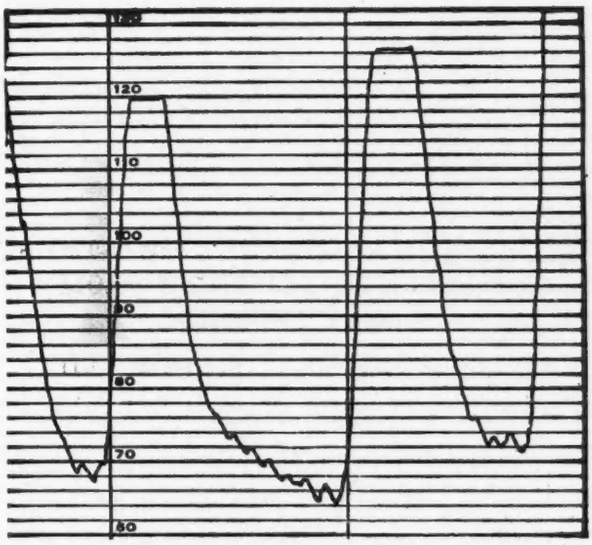


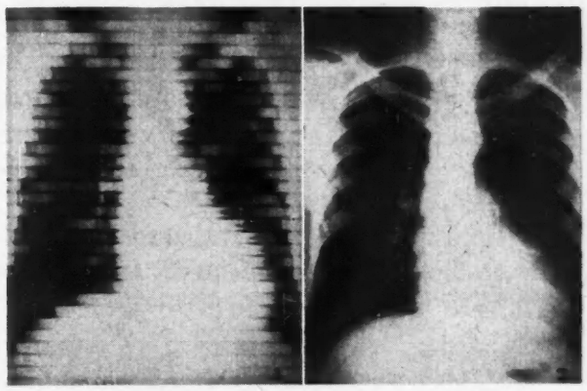
Fig. 1.—The small notches at the base of the curve represent the panting respiratory excursions considered due to the heart action.

sports. About 1934 vague migrating joint pains were present which disappeared following T. and A. in 1936. He was turned down for the armed forces in 1940, because of aortic regurgitation, which was asymptomatic and unknown to him. The patient continued to feel well and his only complaints are occasional pounding sensations in the cardiac area, and slight dyspnœa on exertion for the past three years.

Physical examination.—Height 5′ 8″, weight 130 lb., temperature 98°, pulse 75, respirations 13, blood pressure 170/0. All findings were essentially normal except those for the cardiovascular system, which revealed the typical signs of aortic insufficiency with suspected mitral valve disease. A water-hammer pulse with Duroziez's sign and a blood pressure of 170/0 was found. An aortic systolic murmur of moderate intensity and a slight diastolic murmur were heard over the aortic area in the 2nd interspace to the right of the sternum. These murmurs were transmitted down the left side of the sternum, with the diastolic element becoming more marked in the 3rd and 4th interspaces to left of the sternum. A low pitched systolic murmur of moderate intensity was heard over the apex, which was transmitted out towards the axillæ. The electrocardiogram showed left preponderance.

Description of the unusual breathing.—The patient demonstrates an abnormal type of breathing in the following manner. The recumbent position is assumed. Towards the end of normal expiration he causes an arrest of respiration for a few seconds, at the same time allowing the epiglottis to remain open permitting a free communication of air between the trachea and the open mouth. Coincident with this act, air rushes back and forth through the open trachea and mouth, simulating a shallow panting type of respiration, which can be heard from a distance of several feet in a quiet room. The phenomenon continues for 4 to 8 seconds at the will of the patient. In this relaxed position, he does not use the muscles of respiration in the chest, abdomen, diaphragm or neck, and any voluntary movements of the head, neck, shoulders, chest or abdomen cause the phenomenon to cease immediately. The great vessels in the neck pulsate to a marked degree with the patient in the recumbent position.

Investigation.—With the aid of a wisp of cotton wool held close to the open mouth it was found that the inspiratory phase corresponded with cardiac systole and the marked visible and palpable pulsations in the large arteries of the neck. The trachea did not appear to move during the whole episode. The volume of this panting type of inspiration and expiration was measured with the aid of a spirometer and recorded on a moving drum (see Fig. 1). Due to the natural elasticity of the lungs, expiration was usually larger than inspiration,



but they tended to be equal towards the end of the phenomenon. Average values were 15 to 30 c.c.

Serial postero-anterior x-ray films of the chest demonstrated progressive enlargement of the heart shadow to the left since 1944. Kymographic postero-anterior and lateral studies of the heart in February, 1948 (see Figs. 2 and 3), demonstrated considerable excursions in the regions of the aortic arch, the left ventricle and the left atrium. The diaphragm appeared to undergo a downward movement synchronous with the systolic contraction of the left ventricle, which suggested that this motion was effected by the vascular thrust or contraction of the left ventricle. Fluoroscopic examination showed no evidence of voluntary movement of the diaphragm while the patient exhibited the described type of breathing. A barium swallow showed some flagellation in the regions of the lower trachea and the main bronchi. However, it was not considered to be of sufficient magnitude to account for the volume of air inspired and expired as demonstrated clinically and on the spirometer.

DISCUSSION

The following is the suggested interpretation of the unusual type of breathing described above. The systolic contraction of the heart with its downward thrust on to the diaphragm,

together with the lessening of the cardiac volume with systole, probably accounts for the inspiratory phase. Normal diastolic filling of the heart chambers and the return to its former position, together with the natural tendency of the lungs to collapse due to the pulmonary elasticity, would account for the expiratory phase.

SUMMARY

A case of aortic regurgitation with mitral involvement, which exhibited a panting type of shallow breathing, amounting to 15 to 30 c.c. at the end of a normal expiration with the mouth and epiglottis open, is presented. The physiological aspects as demonstrated clinically and radiologically are discussed. This unusual sign is not recorded in contemporary textbooks of medicine, cardiology, or physical diagnosis.

INGESTION OF OPEN SAFETY PIN IN INFANT

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The following case will serve as a reminder of the necessity of instructing all mothers to close safety pins when removing them from the clothing, etc., of infants.

On August 18, 1948, baby L., aged 6 months, while having her diaper changed, reached up and grabbed an open 1 inch safety pin and

swallowed it before her mother was aware of what had happened. Upon her arrival at the clinic, x-ray showed the pin lodged in the infant's œsophagus, but by the time she had been transferred to hospital it was found to be in her stomach.

On consultation with Dr. C. R. Bunn, surgeon, it was felt that, although surgical intervention would be facilitated while the pin was in the stomach, it would be advisable to follow the course of the pin by x-ray and be prepared to intervene at the first sign of untoward symptoms.

The infant was placed on her normal soft diet and under constant supervision. On August 19 the pin was visualized in the small intestine, on August 20 in the cæcum, and on August 21 a tarnished open safety pin was found in a normal stool.

It is the opinion of Mitchell-Nelson that small pins will probably pass through the gastro-intestinal tract without difficulty, whether they are open or closed. Large pins should be removed gastroscopically. When treating a case expectantly, the diet should be a normal one for the infant's age; the roughage and wool cotton diets one hears mentioned, are valueless and may be extremely dangerous. Laxatives are definitely contraindicated.

Repeat x-rays should be taken and if the pin is shown to change position constantly, moving further down the intestinal tract, perforation will not likely occur. However, signs of perforation such as tenderness, rigidity, pain, nausea and vomiting should be constantly watched for, as immediate surgery is indicated.

BAL IN THE SUCCESSFUL TREATMENT OF MERCURY POISONING FROM GRAY POWDER

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The rarity of mercury poisoning other than from the accidental or deliberate ingestion of bichloride of mercury, and the dramatic antidotal effects of "BAL" (British Anti-Lewisite) have prompted the reporting of the following interesting case.

M.H.M., a white female child was born January, 1946, delivered by Cæsarean section as a breech. The child's development was normal and she had never been ill. The only problem the mother had was with constipation which she stated commenced from a few months of age. Various feeding adjustments were made and the use of glycerin suppositories and patent laxatives and enemas became a daily routine. The child was toilet-trained at twenty-four months of age. In April, the child was being given castoria every other day which was followed the next morning by a bowel movement, which on occasion was described as being slimy with the presence of mucus.

This child was seen by one of us (I.S.) on April 12. Various dietary adjustments were made and gray powder (mercury with chalk) containing 33% mercury was prescribed in a dose of ½ gr. (30 mgm.) daily. At the same time yellow mercuric oxide ointment, 2%, was

prescribed once daily for a small Meibomian cyst of the right lower eyelid.

On April 21, the child developed measles from which she recovered without incident. On May 1, she was seen on account of an urticarial eruption which had developed two days previously. Raised welts were present mostly on the arms, legs and trunk. There was no fever nor constitutional reaction. A cat had been acquired shortly before the hives appeared. At this time both mercury preparations were stopped, the cat was removed, elixir benadryl was given and within twenty-four hours the rash had completely disappeared.

An May 5, the child was seen following a convulsion and admitted to Vancouver General Hospital. The mother gave the history that two days previously a small blister-like lesion had appeared on the lower right eyelid, shortly after she noted a similar lesion on the left hand and a red blotchy rash rapidly spread to cover the entire body. The child was acutely ill and had a fever of 105° F. prior to the convulsion.

Examination at this time revealed a well-nourished, well-developed child of about twenty-seven months. Temperature rectally was 104° F., pulse 120, respirations 30. She gave the appearance of an acutely ill child but was bright, responsive and sitting up in bed.

The entire body was covered by a purplish-red erythematous, slightly œdematous eruption of various shaped plaques. This was most pronounced on the extremities and abdomen. There was a small Meibomian cyst on the right lower eyelid. The throat was injected. The gums were somewhat œdematous and reddened. There were no enlarged lymph glands in the neck. Examination of chest, heart and extremities was not remarkable except for the presence of the skin eruption. There was no liver nor splenic enlargement.

Laboratory data.—White blood cells 5,100, polymorphonuclear neutrophils 7%, staff cells 12%, lymphocytes 74%, monocytes 3%, eosinophils 3%, polymorphonuclear basophils 1%, hæmoglobin 75%, red blood cells 4,000,000. Two days later the white blood cells were 5,000, polymorphonuclear neutrophils 22%, staff cells 16%, lymphocytes 58%, monocytes 4%, sedimentation rate by Westergren method, 13 mm. in one hour. Urinalysis was negative on two occasions. Stool cultures for typhoid-salmonella-dysentery group were negative. Throat swabs were negative.

Treatment.—The child was given elixir benadryl, 10 mgm. every 4 hours, penicillin 25,000 Oxford units intramuscularly every 3 hours, starch baths and Lassar's paste to the skin lesions.

Clinical course.—There was no change in the child's condition with this treatment. Temperature continued swinging to as high as 105° F., remaining for the most part around 103° F. There was little change in the appearance of the skin eruption. She remained, however, fairly bright and responsive and had no recurrence of convulsions.

On the fifth hospital day therapy with BAL was commenced. Dosage based on 3 mgm. per kilogram of body weight was 0.35 c.c. of 10% BAL in oil, every 4 hours for 48 hours. The first dose was given at 4 p.m. and the second at 8 p.m. By midnight the temperature dropped from 103.4 to 98.2° F., the pulse from 150 to 70 per minute. The child appeared brighter, less irritable and took her feedings better. The rash was considerably fainter. Two days later blood examination showed: white blood cells 12,350, polymorphonuclear neutrophils 20%, lymphocytes 39%, staff cells 22%, monocytes 3%, eosinophils 12%, polymorphonuclear basophils 1%. Subsequently the child continued this improvement, the rash continuing to fade, the fever never exceeding 100° F. after the third day of BAL therapy. On that day the dosage was reduced to four injections and thereafter one injection daily for four more days. The child was discharged on the twelfth day, eight days after commencement of BAL therapy, the rash having almost completely faded, the temperature having been normal for three days previously and the child in obvious good spirits.

COMMENT

According to Peters, Waters and their coworkers,[1, 2] the British discoverers of BAL, the toxic effect of trivalent arsenic compounds is due to their chemical combination with essential SH group of certain proteins, especially the tissue enzymes of the pyruvate oxidase system. BAL, however, has a greater affinity than the tissue enzymes for arsenic with which it forms a stable compound which can be excreted.

It has been assumed that the same physiological chemical results are obtained from the use of BAL in mercury poisoning and this has been borne out by the experimental work of the American workers Gilman, Philips and St. John.[3] They found BAL to be a highly effective antidote to acute mercury poisoning in rabbits and dogs. Their work was further substantiated by Longcope[4] and his co-workers, who reported that BAL was capable of neutralizing the toxic action of unusually large doses of mercury bichloride in man. Most of their patients on BAL therapy showed sudden and favourable changes that took place within forty-eight hours and were symptomatically well within two to three days.

The Council on Pharmacy and Chemistry of the American Medical Association[5] has pointed out and emphasized that successful treatment of mercury poisoning with BAL depends on the institution of treatment at the earliest possible moment before irreparable tissue damage has occurred and on the use of adequate amounts of BAL at frequent intervals. Other supportive measures are recommended and should always be given in conjunction with BAL therapy.

BAL is unstable in aqueous solution and must be administered intramuscularly in an oil solution. The available preparation is a 10% solution in a vehicle containing 10% benzyl benzoate in peanut oil.

Gray powder (mercury with chalk) is a commonly recommended remedy for chronic constipation in children especially in the British Isles,[6] and calomel is even more universally used in the treatment of constipation in adults.

DISCUSSION

This child was seen by one of us (B.K.) regarding an extensive skin eruption while in the hospital. Clinically, she appeared somewhat

listless and irritable, her gums were inflamed, reddened and œdematous. Dermatologically, this patient presented two distinct eruptions, that on her right cheek in the neighbourhood of her right eyelid appeared to be a contact dermatitis, characterized by erythema, œdema, exudation and crusting and scaling, presumably due to the local application of yellow oxide of mercury. The rest of the skin on her trunk and extremities showed an extensive toxicoderma of the erythema multiforme variety. This maculo-papular rash was manifest in varying sized circular lesions, all of which were œdematous and ranged in colour from erythema to a violaceous hue and some appeared hæmorrhagic. Benadryl had been ineffective.

Despite the use of penicillin this child ran a persistent spiked temperature associated with a persistent leucopenia of the granular series. The absence of glandular, liver and splenic enlargement coupled with the presence of leucopenia and normal sedimentation rate served to rule out infectious mononucleosis. In reviewing this case it was felt that in view of the ingestion of mercury with chalk and the local application of yellow oxide of mercury followed by toxicoderma, spiked temperature, convulsion, and leucopenia, the diagnosis of mercury poisoning was tenable.

It may well be that the local sensitization to yellow oxide of mercury after measles was the precipitating factor in the development of the mercury poisoning. Although the urinary findings were essentially normal, they are in keeping with the observation of Longcope *et al.*[4] They found that several of their patients swallowing 0.5 gm. of bichloride of mercury or less had no evidence of kidney involvement. Our patient had received approximately 0.2 gm. of mercury. The dramatic results obtained with the first injection of BAL in this child serves as a therapeutic test and gives further support to the diagnosis of mercury poisoning. Within four hours after the first injection of BAL the child became interested in her surroundings, the generalized eruption seemed virtually to disappear, leaving a very faint erythema at the involved sites with complete absorption of the œdematous element. Within eight hours the temperature dropped from 103.4 to 98.2° F. and the pulse from 150 to 80 per minute. Two days after onset of BAL therapy the white cell count had risen from 5,000 to 12,350 and the polymorphonuclear and staff cells had increased from 7 and 12 to 20 and 22% respectively. The child was discharged eight days after institution of BAL therapy with practically no evidence of her skin eruption, a normal temperature for three days and in obvious good spirits.

SUMMARY

1. A case is reported of a child, age two, who showed signs of mercury poisoning following the ingestion of gray powder (mercury with chalk) for the treatment of constipation.

2. BAL therapy resulted in a dramatic and sudden recovery.

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2356 W. 41st Avenue.

To go further regarding this doctor-patient relationship we must be constantly on guard regarding what we say within the patient's hearing. A story which I heard recently will well illustrate the point which I am trying to make. This occurred within the past few months in the ward of one of the teaching hospitals in New York City. Several doctors were grouped about a hospital bed in which lay a patient with an abdominal tumour. The patient was a young man, 19 years of age, not acutely ill, and entirely clear mentally. One of the doctors said, "I believe that this patient has a hyper-nephroma". Another said, "This patient seems to me to be quite similar to a patient which we had on Ward 4 about two months ago". "How did that patient get along?" asked another. "He is dead and we have the slides on his case." "Have we any slides yet on this case?" "Of course not, but we will have in a few weeks," and the group of doctors moved away, and you can well imagine the feelings of the young man about whom this discussion took place. To this group of doctors, this young man was a case and not a patient. I cannot criticize this attitude on the part of members of our profession too severely.—*Commencement Address*, Brig.-Gen. Geo. E. Armstrong, Deputy Surg. Gen., U.S. Army, June 9, 1948.

THE CANADIAN MEDICAL ASSOCIATION

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EDITORIAL

PLANNING FOR SOCIALIZED MEDICINE

IT is often said that no country which has ever undertaken any plan for the provision of medical care of its people has ever abandoned the idea. That may be quite true, but it is not necessarily an unanswerable argument in favour of socialized medicine. To continue moving forward is desirable, but it is worth considering the direction we should follow.

The history of all such developments, aside from frank bureaucratic medicine, as in the U.S.S.R., has really been that of gradual growth, with many compromises and adjustments. What we are faced with nowadays in Canada at any rate, is what appears to be an overpowering demand for immediate and complete socialization of medical services. It is true that the plan under which this is to be carried out is not yet clearly defined, but that is either an intentional obscurity of purpose, or a lack of thorough consideration of all the factors of the problem. If it is the first of these alternatives it bodes a poor outlook for those who must carry out the program as their professional work. The second alternative is self-condemned.

If it should be said that in any case there is urgent need for dealing with the health problems of the nation it may at least be replied that the urgency does not show itself in a deterioration of the nation's health. The highest standards of health are sought by all without exception, and are constantly being striven for by the medical profession.

What medical men look for in vain is the keeping before the public of the inexorable results of socio-economic factors in such proposed planning. Will socialized medicine, by, let us say, a system of health insurance, reduce the economic burden of illness? Undoubtedly it will in many cases. To that extent the medical profession is sincerely in favour of it. But history shows that whilst no country has gone back on socialized health planning no country has been able to prevent its costs from rising steadily, in some instances to dangerous heights. To say that we are dealing with such an important matter in health that we should be willing to allow for disadvantages in the plans is not good enough. This implies that after all many advantages will be gained, and minimizes the fact that economically there must be a limit to what a country can spend, even on health.

Another point which is insufficiently stressed is the effect on medical practice itself by direction from what can only be called bureaucratic sources. There must of course be some degree of control in this sort of planning; political reassurances to the contrary are not convincing. But even control can be acceptable if it is self-imposed. We would like to be assured that our views will be given consideration in whatever plans are evolved. We do not feel that the practising physician's point of view is sufficiently well represented by public health officials.

The greatest experiment of the day in socialized medicine is in progress in Great Britain. Canada has the good fortune to be able to watch what is happening in a social laboratory where conditions are similar enough to our own to permit of appreciating the significance of what is going on. But it is an experiment which demands time as the most essential requirement in assessing its results. It might be wise to watch the British situation for at least another 18 months before commiting this country to any formal system of socialized medicine.

ANTABUSE

MANY alcoholics and their relatives have learned from the daily and weekly press of the intriguing properties of a new drug for the treatment of alcoholism. Already many doctors have been importuned to obtain the drug and start administering it. We strongly recommend that any doctor who contemplates prescribing this drug should read the article which appears elsewhere in this issue. Then he should follow the advice of Dr. Jacobsen of Copenhagen and, after taking the drug, try the effect of alcohol on himself in the presence of a medical colleague who is prepared to spend a few hours in attendance. The severity of the cutaneous vasodilatation which follows the ingestion of a few ounces of whiskey after a course of antabuse, must be seen or felt to be appreciated. The impact, even on a normal vascular system, is to quote Dr. Jacobsen "formidable". *As yet no antidote has been discovered which will abort*

an unduly severe reaction. What would happen to a patient with cardiovascular disease who was subjected to this reaction is still a matter for speculation.

The burden of responsibility which has been thrown so suddenly on the general practitioner is heavy, and indeed unfair. No large body of experience with this drug is available for guidance. The clamour for its use will be persistent. It seems likely that antabuse will prove valuable in the management of certain cases of chronic alcoholism. In the meantime it should be recognized as a potential hazard to life in some circumstances. It goes without saying that the great majority of the profession will exercise their usual good judgment in selecting the cases and circumstances suitable for experimentation with this drug. We can only hope that none of the material will get into the hands of pranksters or other irresponsible persons.

J. K. W. FERGUSON, M.D.,
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University of Toronto.

THE TREATMENT OF ALCOHOLISM

THE "problem" of alcoholism is not a single problem but includes a vast variety of conditions of tremendous moment from both individual and public aspects. Because of a false emphasis on a unitary condition, over many years, a search has continued for a remedy of this "illness". The recent publicity in the press on antabuse may create the impression that at last "a cure" has been discovered.

It is clear that the etiology of alcoholism is exceedingly complex and embraces, in a unique manner, the intricate nature of personality, the complications of social existence as well as the physiological make-up of the individual. The problem is obviously too vast to be considered in the rigid framework of organic medicine.

The reports to date on antabuse do not indicate that this chemical is a specific for alcoholism, but further clinical trial may prove it of value in selected cases as an aversion drug. Abstinence, encouraged by the drug, would conceivably aid the patient while he is learning to deal with his problems. That antabuse itself is the answer to alcoholism is extremely unlikely.

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EDITORIAL COMMENTS

Pesticides

The rapid development of pesticides has led to problems of more than one kind. The first and most obvious is that arising from the indiscriminate destruction of insects and various small forms of life. One group of insects may be destroyed, only for the plants to be attacked by other plagues less resistant to DDT which had been kept in their place by the insects so thoroughly eliminated. It was all very well in sterilizing malaria-infested areas, and in dusting to get rid of body lice. Now however, synthetic pesticides have themselves developed pest-like qualities, in the form of public health hazards.

It is estimated that about 7,000 pesticides are on the market, and at least some of these may give rise to poisonous residues in food. There seems to be very little factual data as to their effects on human beings, and there is nothing to show to what extent or in what way they should be used without their becoming dangerous. What we are finding out about the most widely used—DDT—only goes to show how extensive its effects may be. Cows not only store it in their body tissues but may excrete it in their milk. Steers whose food has been contaminated with DDT store it in their fat. DDT can be removed from certain fruits and vegetables before canning, but there seems to be little protection in the case of fresh fruits and vegetables.

Another danger, difficult of estimation but possible of extreme gravity is that of upsetting the balance of nature by the indiscriminate use of DDT.

Some of the newer insect killers actually penetrate the tissues of the plant it is meant to protect. One such substance, benzene hexachloride, has caused some loss of crops because it has an unpleasant taste. Another, called parathion, now on the market, is said to be toxic and special precautions have to be observed in connection with its use. It too may be absorbed by the plants. It is questionable whether any toxic material should be open to indiscriminate use, and in any case it would be wiser to investigate all pesticides to the fullest extent before they are allowed to be sold.

Erratum

In the paper by Drs. Murray and Denton on "Plaster of Paris as a Source of Infection in Tetanus and Gas Gangrene" (January, 1949) the following correction should be made. The statement on page 3, second column, 8th line from bottom should read "when 'unsterilized' plaster was used, etc.".

MEN and BOOKS

THE CENTENARY OF THE ORIGIN OF ENDOCRINOLOGY*

A Tribute to Thomas Addison (1793 - 1860)

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While the great value of the contributions of experimental physiology to practical medicine and surgery is generally acknowledged, there is no lack of instances in which the incentive for physiological research was prompted by sound clinical observations. A notable example of this approach to the acquisition of fundamental knowledge is represented by Thomas Addison's studies of the effects of pathological conditions involving the suprarenal glands, the first public announcement of which occurred 100 years ago. Therefore, it seems appropriate at this time that some recognition be afforded the circumstances relating to that important event.

At a meeting of the South London Medical Society which was held on March 15, 1849, Dr. Thomas Addison was invited by the President, Mr. John Hilton, author of the surgical classic *Rest and Pain,* who was in the chair, to discuss his observations relative to a puzzling form of anæmia, in which it was known that Dr. Addison was interested. The subject of the discourse was "Anæmia — Disease of the Suprarenal Capsules".

According to the report of that meeting, as published in the *London Medical Gazette,* Dr. Addison described a remarkable type of anæmia which, although incidentally noticed by various writers, had not attracted, as he thought, by any means the attention it really deserved. It was a state of general anæmia which, for several years, had been with him a subject of earnest inquiry and deep interest. He then gave an exact, concise description of the clinical manifestations of the condition which we know today as pernicious anæmia.

Addison next proceeded to give the details of several cases which had fallen under his own immediate observation. In three cases only was there an inspection of the body after death but in each of these a diseased condition of the suprarenal capsules was found. In two of the cases, no disease whatever could be detected in any other part of the body.

Addison questioned the possibility of these lesions being merely coincidental. It might be so, but he thought not and, making every allowance for the bias and prejudice inseparable from the hope or vanity of an original discovery, he confessed that he felt it very difficult to be persuaded that the association between the clinical findings and the state of the suprarenal capsules was merely accidental. On the contrary, he could not help entertaining a strong belief that these hitherto mysterious bodies, the suprarenal capsules, may be either directly or indirectly concerned in sanguification; and a diseased condition of them, functional or structural, may interfere with the proper elaboration of the body generally, or of the red particles more especially. At all events, he considered that the time had arrived when he felt himself warranted in directing the attention of the profession to these curious facts.

Judged by the recorded discussion, Addison's remarks created little, if any, impression upon the hearers. Those who bothered to discuss the paper were of the opinion that the suprarenal bodies did not perform any important function; furthermore, they were unconvinced of the existence of any relationship between the diseased condition of the suprarenals and the demise of the patients.

Despite the indifferent reception of Addison's views, there was no doubt about the originality of his observations. Quite unconsciously, he described at that meeting 100 years ago, two diseases and incidentally laid the foundation for modern endocrinology. His friends urged him to persist with his observations and, subsequently, to make known his discoveries. So Addison continued to see patients fade away without his being able to find any striking morbid appearances after death but sometimes he met with obvious disease of the suprarenal capsules and he attempted to connect the existence of these lesions with a peculiar discoloration of the skin.

It is clear that Addison failed to distinguish the suprarenal disease from fatal anæmia. He was evidently confused as to the relationship of these two disorders and, even in his *Treatise* which was published six years after the first announcement of his research, he spoke of the two maladies in conjunction. Any criticism on this point must be weighed against the fact that Addison based his opinions entirely upon clinical observations and gross pathological appearances. The differentiation between the two diseases was made subsequently by Sir Samuel Wilks.

Addison's speculations were the more remarkable when one considers that, at the time, physiology was in its infancy; the doctrine of the internal secretions had not been suspected; the hæmocytometer had not been invented: Virchow's "Cellular Pathology" was not published until 1858, two years before Addison's death; and the various cells of the blood were not clearly differentiated until near the end of the 19th century.

Addison's best known published work "On the Constitutional and Local Effects of Disease of the Suprarenal Capsules", which appeared in 1855, is a medical classic. It not only immortalizes the name of Thomas Addison as the discoverer of a disease of the adrenal glands, but it is a sample of excellent English writing,

* Read at a meeting of the Harvey Club of London, Canada, October 8, 1948.

the product of a truth-seeking and logical intellect.

His conclusions, pertaining to the new morbid entity, were based upon the detailed clinical and pathological study of only 11 cases! He never published anything further on the subject. In five of Addison's patients, the lesions of the suprarenal glands were considered to be tuberculous; in one case there was atrophy and in four cases carcinoma was found. The term "Addison's Disease" was suggested originally by the French physician, Armand Trousseau, who apparently was impressed, more than many of Addison's own countrymen, with the true significance of his observations.

Most physicians are familiar with Addison's remarkable descriptions as disclosed in his "Disease of the Suprarenal Capsules". The preface to this work begins as follows:

> "If pathology be to disease what physiology is to health, it appears reasonable to conclude that, in any given structure or organ, the laws of the former will be as fixed and significant as those of the latter, and that the peculiar characters of any structure or organ may be as certainly recognized in the phenomena of disease as in the phenomena of health."

A more significant dictum of medical philosophy was never written. Developing his subject, Addison related:

> "For a long period I had, from time to time, met with a very remarkable form of general anæmia, occurring without any discoverable cause whatever—cases in which there had been no previous loss of blood, no exhausting diarrhœa, no chlorosis, no purpura, no renal, splenic, miasmatic, glandular, strumous or malignant disease.
>
> "Accordingly, in speaking of this form in clinical lecture, I, perhaps with little propriety, applied to it the term 'idiopathic', to distinguish it from cases in which there existed more or less evidence of some of the usual causes or concomitants of the anæmic state.
>
> "The disease presented in every instance the same general character, pursued a similar course and, with scarcely a single exception, was followed, after a variable period, by the same fatal result."

Then follows a clinical description of pernicious anæmia, so complete in every detail that it has not been improved upon subsequently.

Addison went on to say:

> "It was whilst seeking in vain to throw some additional light upon this form of anæmia that I stumbled upon the curious facts which it is my more immediate object to make known to the profession; and however unimportant or unsatisfactory they may at first sight appear, I can not but indulge the hope that, by attracting the attention and enlisting the co-operation of the profession at large, they may lead to the subject being properly examined and sifted, and the inquiry so extended as to suggest, at least, some interesting physiological speculation, if not still more important practical indications.
>
> "The leading and characteristic features of the morbid state to which I would direct attention are anæmia, general languor and debility, remarkable feebleness of the heart's action, irritability of the stomach, and a peculiar change of colour in the skin, occurring in connection with a diseased condition of the suprarenal capsules."

What of the man who thus "stumbled upon", to use his own expression, such an enduring contribution to Medicine? His life, which was so intimately linked with his work, has been described by several eminent writers and the following account is a composite review of their publications.

Thomas Addison was born, of humble parentage, in April, 1793, at Long Benton, near Newcastle-on-Tyne, in Northumberland, England. He was descended from a family which had resided for centuries at Lanercost, eight miles from Carlisle, in Cumberland near the Scottish border and it was there that Addison's interest, apart from his professional activities, was centred.

His early education was acquired at the village school in Long Benton and afterward at the grammar school in Newcastle. Thence he went to Edinburgh to commence his medical studies. His familiarity with Latin was such that it was his habit to take down lecture notes in that language. He graduated M.D. in 1815 at the age of 22, the title of his thesis, written in Latin, being *"De Siphilide et Hydrargyro"*. Addison migrated to London where he obtained an appointment as house surgeon at the Lock Hospital. The training acquired there led to his being considered an authority on the particular disease treated at that institution.

The next step in his career was his attachment to the General Dispensary where, evidently, he came in contact for a time, at least, with the celebrated dermatologist, Dr. Thomas Bateman. Addison acquired a great knowledge of cutaneous diseases and probably he was the first physician in London to give clinical lectures on diseases of the skin. Doubtless, he could have been successor to Dr. Bateman had he so desired, even before dermatology was recognized as a specialty. But Addison was hostile to specialism; apparently his mind was too great and his interest too wide for his being content with studying diseases of only a part of the body. It is quite probable that, but for Addison's experience with cutaneous abnormalities, the bronzed skin of some of his patients would not have attracted his attention so forcibly as to incite him to inquire into its causation.

Evidently, out of recognition of the prevailing ingrained prejudice that unless a man had actually been a student at one of the London hospitals he was not eligible for an appointment to its staff, Addison registered as a pupil at Guy's Hospital in 1817, being at the time a fully qualified practitioner. Whether he entered as an ordinary student or not is uncertain, but there is a record of his payment of fees on two occasions. However, seven years later, when the office of assistant physician became vacant, Addison's name was proposed as

a candidate for the post. It is to the everlasting credit of Mr. Harrison, then the administrative head of the hospital, that he asserted the power virtually invested in him by the governors and selected Addison as a physician fully calculated to carry out the promotion of charity and the extension of the reputation of the school. The election was highly competitive, one of the five unsuccessful applicants for the position having been recommended by the King.

This appointment led, in consequence of an early vacancy, to the chair of Materia Medica. Addison's reputation as a teacher steadily grew. At the time when students paid fees for individual courses of lectures at different hospitals, the most attractive lecturers drew the largest attendance. It is estimated that Addison's lecture fees amounted to £700 or £800 a year.

In 1837, he was appointed full physician to Guy's Hospital and collaborated with Dr. Richard Bright in the duties of the chair of Medicine. At this period, Bright and Addison commenced to write a textbook on "The Elements of the Practice of Medicine". It was generally recognized, however, that the greater portion of this work was from the pen of Addison. Only one volume was ever published. Addison succeeded Bright on the latter's retirement in 1840.

Strangely enough, Addison's treatise on disease of the adrenal capsules, which was published near the end of his career, was less valued by his students and professional colleagues than his earlier works. Thomas Addison had several "firsts" to his credit, *viz.*:

1. A description of the clinical signs and symptoms associated with "fatty degeneration of the liver".

2. The first accurate account of appendicitis.

3. The demonstration that pneumonia is not an inflammation of the parenchyma of the lung but that its morbid anatomy consists of an inflammatory exudate into the air cells. Incidentally, Addison was one of the first physicians in England to appreciate Laennec's method of auscultation.

4. The demonstration that tubercles are not the sole cause of the change in the lung in phthisis but that ordinary inflammation contributes; in other words, tuberculosis is a mixed infection.

5. An original description of the nodular form of xanthoma and the first account of xanthoma diabeticorum.

6. The differentiation of Alibert's keloid from true keloid (morphœa, localized scleroderma, Addison's keloid). The originality of this work, however, is open to question.

7. A perfect clinical description of the condition which became known as pernicious anæmia. The term Addison's anæmia was suggested in 1909 by Addison's loyal followers at Guy's and has been accorded general acceptance.

8. The discovery of the existence of Addison's disease, its complete clinical description and its correlation with destruction of the suprarenal glands.

9. Addison was the first to introduce the practice of clinical clerking. He encouraged his house officers and students to write reports of their cases. This regular method of systematic case-taking, which Addison instituted in 1828, has continued to the present day. Several of the case records in his book on adrenal disease were compiled by his ward clerks.

Apparently, not any of Addison's discoveries, the results of indomitable perseverance, brought him fame in his lifetime. Nevertheless, during it he enjoyed a great reputation at Guy's, due to his personal influence, to his surpassing ability as a teacher and to his clinical skill. He is included in that gallant company known as the Great Men of Guy's along with Sir Astley Cooper, Richard Bright, Sir Samuel Wilks, John Hilton, Sir William Gull, Thomas Hodgkin and he had as contemporaries, also, the Irish physicians Robert Graves and William Stokes—names immortal wherever medicine is taught and studied.

Thomas Addison was a misunderstood man in certain respects. From the professional standpoint, no physician probably has exhibited in higher degree the sterling qualities of true professional integrity. It is said that no word of disparagement against a professional brother ever escaped him. He would stoutly uphold what he believed to be the truth but he was not intolerant of the opinions of others. He loathed advertisement, indignantly refusing to write what he called "puffery". While he often did kindness by stealth, as it were, his professional bearing is claimed to have been to the last degree honourable.

Addison did not marry until rather late in life, at the age of 54. His wife was the widow of Mr. W. W. Hauxwell. The marriage took place in the Abbey Church at Lanercost in September, 1847. Mrs. Addison survived her husband by 12 years. There were no descendants.

Addison is said to have been for the most part an unremitting worker. He trained himself to take infinite pains and to cultivate the art of exact observation. He was always at work either in the wards or in the dead-house and so attained an enormous experience, on which he relied more than on book knowledge. No time was too long for the examination of a patient. He was never content with a superficial diagnosis and always endeavoured to find a cause for the symptoms and physical signs exhibited by his patients. Little wonder that his class were wearied at times by his unceasing zeal for investigation and for pathology; but, after all, these are the things upon which accurate diagnosis depends.

It is related that once in the middle of the night and to the astonishment of the Sister in charge, he appeared on the hospital ward because, when he got into bed at home, he remembered that he had not satisfied himself with respect to some detail concerning the examination of a patient whom he had seen during the afternoon. On another occasion, after seeing a patient about ten miles distant from London, he remembered on his near return to the metropolis, thinking over the case on his way, that he had omitted some seemingly important inquiry and he posted back several miles for the purpose of satisfying his mind on the doubt which had occurred. These stories throw some light on the character of the man.

Addison was acclaimed as one of the foremost diagnosticians of his time but he was criticized by some because, having made a diagnosis, often he did not suggest any treatment for the patient. Probably this was but another manifestation of his honesty since, in a great many instances, he had to admit that he did not know any drug which would be of benefit.

While Addison was recognized, also, as one of the most impressive and popular teachers of his day, the students respected rather than revered him. He was dogmatic in his teaching and thus the pupils accepted as pure gospel every word which flowed from his lips. The force of his words was enhanced by his oratory and by the commanding presence of the man himself. One of Addison's biographers describes him thus:

> "Addison was of good height and stood erect with coat buttoned up high, over which hung his eye eyeglass. He wore a black stock with scarcely visible shirt collar. He had a well-proportioned head, with dark hair and side whiskers, large bushy eyebrows and smallish dark eyes, thick lips which enclosed his firmly knit mouth. His features were not refined but belonged to a powerful mind and showed no trace of any kind of sentiment. His penetrating glance seemed to look through you and his whole demeanour was that of a leader of men."

However, his personality was such that, at times, he appeared haughty, domineering, unapproachable and even rude. Evidently Addison knew of this failing and explained it as a cloak for his nervousness but beneath it all he was an amiable, likeable man, as those who knew him best asserted.

A study of Addison's life history from the psychological point of view discloses an explanation for the somewhat paradoxical features of his personality and behaviour. He laboured under the cloud of a grave handicap, namely, mental illness, the existence of which he himself and some of his close associates were aware. He was subject to attacks of such appalling depression that in early life he had intended to make away with himself but fortunately was dissuaded through propitious circumstances. His habit of walking about the streets at night in order to get some relief laid him open to misrepresentation. He admitted that he never rose to give a lecture or to address a meeting without feeling nervous. But it is said that his defensive mechanism was so highly developed that he appeared self-contained. Over-compensation in this regard may have accounted for his reputed abrupt, egotistical and somewhat blustering manner.

Great as was Addison's reputation among those of his own profession who knew him, he was not successful in building up a large practice and he was almost unknown to the general public. So much the better for the science of Medicine for he was left free to teach and to make his discoveries. While Addison never became a fashionable, or even popular physician, he did gain an unrivalled reputation as a consultant. One experience connected with his private practice is interesting. "He was called to see a member of the Rothschild family in Paris. Trousseau, Nelaton and all the élite of the profession in that city attended a public dinner in his honour. His health was proposed and Addison replied in excellent French. Truly a prophet is not without honour save in his own country."

Because he was of a retiring, somewhat forbidding nature and since he was a conservative writer, the medical public in England, outside of those with whom he was in immediate contact, paid little attention to him or to his discoveries, in his lifetime. The Royal College of Physicians did not elect him as a Fellow until 19 years after he had become a Licentiate; he never lectured or held any office at the College. No university gave him an honourary degree. He was never the recipient of a title and held no Court appointment. Even although the discovery of the disease which bears his name was eventually such a stimulus to physiological research, he was never a Fellow of the Royal Society. Nor was he a member of the Pathological Society, and the Royal Medico-Chirurgical Society refused to publish some of his papers, even after he had been President of it. Subsequently, his fame became world-wide when his fundamental discoveries in several fields of Medicine were duly appreciated.

In the early part of 1860, the mental disorder necessitated his retirement from hospital and private practice. A deputation begged him to reconsider his resignation but he replied: "My work is over, I have left it for others." His condition deteriorated rapidly thereafter. He became paranoiac and suicidal. On June 29, 1860, he evaded his attendants and threw himself out of a window—a tragic termination of a distinguished career! Neither *The Lancet* nor the *British Medical Journal* published an obituary notice.

In accordance with his expressed wish, Addison was buried under the old yew trees in the Abbey churchyard at Lanercost. For a long

time the grave was neglected and allowed to become overgrown with weeds but now the authorities of Guy's Hospital contribute to its perpetual upkeep and care.

The sentiment expressed in a paraphrase of a portion of the famous speech of Mark Antony (Julius Cæsar, iii, 2):

"The *good* that men do lives after them;
The *evil* is oft interred with their bones".

would seem to be singularly applicable to Thomas Addison. Here is an example of a person with manic-depressive psychosis who directed his preternatural energy to a noble purpose. Would that others who attained high places with a similar trait could have done likewise!

As proof of the posthumous esteem in which this genius, with whose name three diseases have been associated, was regarded is the marble bust, said to be an admirable likeness of Addison, for which a subscription among the profession was raised. This was placed in the museum at Guy's Hospital where, also, one of the medical wards was named after him. On June 19, 1926, the Border Counties Branch of the British Medical Association held a meeting at Lanercost Priory in commemoration of this great practical physician. Recently, an annual Addison Lecture has been instituted at Guy's Hospital.

Addison's successors were not hasty in taking up his unfinished task of exploring the hidden mysteries of the suprarenal capsules, but the spirit of this pioneer in the field of clinical research should rejoice in the reality that the seeds of truth which Addison planted a century ago have come to full fruition within the past 25 years. The modern physiological truths, the biochemical wizardry and the therapeutic achievements, relative to diseases of the adrenal glands, not only affirm the practical indications which Addison made known but they surpass even his most vivid expectations.

Excerpts drawn from several of the publications listed below have been included in this paper and their use is hereby acknowledged.

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MEDICAL ECONOMICS

THE MEDICAL PROFESSION AND THE FEDERAL HEALTH GRANTS

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Some of the energy put into the conquest of this country is now being directed to consolidating it and making it more livable for its citizens. As an instance of this the Canadian people last year through their Dominion Parliament have attempted a marked expansion of their health services. By an annual expenditure of $30,000,000 parcelled out to the provinces through ten separate grants they are attempting to bring the benefits of modern medicine to more of their number. As well as calling for an extension of health services all along the line these grants may bring into play forces that will alter the pattern of medical practice, for the planners at Ottawa envisage that the diagnosis and treatment of mental disease, tuberculosis, cancer and venereal disease eventually will be free to all Canadians. Making these services free is of far reaching import to the profession of medicine, to departments of health and to our people. Such an expansion is another instalment of health insurance, and we have never examined closely what happens when a people swallows such a large dose of this modern panacea for some of its social ills. Its sponsors hope that this can be done without injury to the dignity or liberty of those rendering or receiving the services. It is an example of what seems to be going on everywhere in modern society, namely, a search for a formula whereby it may organize itself more closely without undue hurt to individual freedom or the hamstringing of natural capacities of many of its members.

With the monies now available some of our people are determined to try new methods of distributing the benefits of medical treatment. Others greatly fear that in accepting some of these funds voluntary contributions will dry up. In this province magnificent help has been given in the care of crippled children, by individuals, service clubs, etc. In tuberculosis detection a program has been built up whereby in 1947 more than 300,000 persons were x-rayed, the whole financed by local Christmas Seal committees. If these efforts should languish or cease we would lose much more than mere dollars and cents.

If changes are to be made we must play a worthy part by exercising some leadership. To date medical economics has not excited or even interested many of our number. Too often our business discussions have been confined to a consideration of fees. In attempting to put these thoughts on paper I may be venturing

where wiser men than I fear to tread. I do so in order to stimulate discussion as we are in need of a better understanding of the public relations of modern medicine. I write as a private individual and not as the President Elect of the Ontario Medical Association.

We have now a number of successfully operated forms of health insurance. Some of these are: the medical care provided by the Workmen's Compensation Boards; the medical and hospital care extended free by governments to widows, and to blind and old age pensioners; the Blue Cross hospital insurance, and the voluntary prepaid medical insurance schemes. These programs prove that the application of the principle of health insurance to medical costs is no longer in dispute. The Canadian Medical Association has approved of health insurance in principle provided it is fair to those rendering and to those receiving the services.

ADJUSTMENT OF MEDICAL SERVICE TO SOCIETY

We know, or ought to know, that there is a gap between the technology of modern medicine and its social application, for the simple reason that many cannot pay for the costly services now used in the diagnosis and treatment of many diseases and injuries. This is particularly true of many sufferers of mental disease, cancer, tuberculosis and arthritis. Disregarding for the moment the merits or demerits of this question the public has every right to apply the principle of health insurance to part or all of these medical costs if it chooses to do so. As a profession we number exactly one to every one thousand of the whole population of Canada. If you are a doctor who thinks there is no public demand for this we simply take issue with you as forcefully as we can in the hope that soon you will revise your opinion and thereby help rather than hinder us.

We know also that the medical profession has rights in this matter, but must insist that instalments of health insurance do not endanger our necessities, economic and otherwise. To understand what these rights are we must keep abreast of the best thinking in the land on all social policies involving our interests. Sometimes when thinking of public relations of modern medicine we are plagued by two viewpoints, that of the profession and that of the public welfare. We make no apology in stating that we consider the public welfare viewpoint to be of prime importance, believing that the closer we can come to this and genuinely adhere to it, the more certainly it will prove to be the best course for the profession to follow. Even if this should result in minor clashes with the attitude of some colleagues we still hold that it is not heresy or even disloyalty. We all want the best possible health services within the resources available.[1]

We would emphasize that the people clamoring for improved health services should realize what amazing progress has been made during the past fifty years, though neither public health nor medicine can claim credit for all of it. Many appear naively ignorant of what our forebears and elders have accomplished. Consider the following statement:

> "Since 1900 life expectancy in the United States has gone up from 49 years to over 66 years. Ours would be about the same. In each age group of the first thirty years of life there has been a decline of fully two-thirds in the mortality rate obtaining in 1900. In other words, life today in its first 30 years has only one-third of the mortality hazard that obtained at the beginning of the century. In the 30 to 39 age group the decline is well over one-half and approaching two-thirds. In the 40 to 49 age group it is well over one-third and nearly a half. In the 50 and over age groups there is little decline, though the female death rate here is going down slightly."[2]

This remarkable improvement in the health of our people has taken place in less than two generations. Such facts largely are being ignored by the critics of our social order with its emphasis on free enterprise. Our "muddling along" has been pretty effective in some fields. In the light of these facts it would seem wise that a study of proposed socio-medical changes should include a close scrutiny of the historical background. At least one lesson from these figures would seem to be that we would be well advised to make haste cautiously.

ADMINISTRATION BY PUBLIC HEALTH AGENCIES

It appears that the expenditure of these large sums of money will be made through provincial departments of health, and if so, these will become much stronger and more influential. Many would prefer that this be done through commissions. The Dominion government has different views from that of some of the provincial governments, and this results in a clash of political ideologies. It would appear preferable that health problems should not be a matter for contention in the political realm. Administration by commissions would avoid much of this. There is some distrust by the profession of public health agencies as administrators of health insurance schemes. Why do we fear and distrust them? We do not deny that they do good work. Is it because they sit behind desks and get out of touch with individual patients, thereby sterilizing medicine of much of its warmth and solicitude for the patient? This lack of confidence in departments of health as reliable planners of the future is reflected in our attitude to some of the individual grants.

The annual grant for general public health of $4,000,000 will increase yearly until in four years it reaches $6,500,000, that is fifty cents more for every citizen than is now being spent. The Hon. Paul Martin in his address to the Canadian Medical Association in 1948 stated that in this way it is hoped "to have more

success in improving child and maternity mortality rates; to take preventive action against blindness; to keep well under control the infectious diseases and to open a vigorous drive against the great cripplers—polio, arthritis and rheumatism,—and to extend and consolidate all the public health advances". This alone is a very comprehensive program.

Because of uncertainties as to what the public may force us or the politicians to do the medical profession in Ontario feels that the time is opportune to study its relationship to the Department of Health. To this end its Board of Directors set up a committee on medical care and the personnel of this are the chairmen of subcommittees on cancer, tuberculosis, public health, etc., about ten in all. The subcommittee on public health proposes to deal with three broad aspects of its problem. The first has to do with the historical background; the second with the present facilities and activities of the health department both at the provincial and municipal levels, and the third with future recommendations. Dr. J. A. Melanson of Fredericton, N.B., in this *Journal* recently gave a very workable definition of the functions of a provincial department of health in these words. "It is intended to serve the people and to assist the medical profession."[3]

Over two years ago the Ontario Department of Health after little consultation with the profession asked for an examination of every pregnant woman with a report to the department. For filling out a form with some 93 questions on it, including a blood Wassermann report, for each patient the doctor is paid $5.00. To date a little less than half the expectant mothers are having the forms filled out for them by their doctors and returned to the department. Some of our ablest practitioners refuse to use them. When asked why, they gave the following answers. "Why should I do a blood Wassermann on a woman whom I know has not syphilis?" "If they wish to discover the presence of syphilis why do they not say so and ask for this only?" "With their long questionnaire are they gathering statistics on the incidence of varicose veins, or heart disease, or a history of dysmennorrhœa among expectant mothers?" "Are the forms reviewed? If so, by whom and to what purpose?" On the other hand some doctors feel that by using these forms they learn more about their patients and if it aids to any extent in the detection of syphilis it has their approval.

Asking Ontario doctors to do this may not have been a major error in policy but its results of incomplete acceptance point up clearly one reason why we fear departments of health. To men in offices the request to fill out forms such as these may seem a rational way to improve the practice of medicine, but to many busy physicians such paper work is a useless burden. The codification of medical procedures in this manner serves little useful purpose to many good men. To gather good apples one has to do more than shake an apple tree—one has to know how to grow good apples. The solution would seem to be simple. We must not allow departments of health to become powerful enough that they can take unilateral action. If all parties concerned would put their feet under the same table as frequently as necessary the correct answers would be arrived at more often. The fault is not all on one side. The general profession has been averse to thinking about any short or long term planning in the public health field. It is becoming imperative that there be a better liaison between the profession and the department of health.

Another example is the recent repeated requests of the Department of Veterans' Affairs to start the treatment of civilian patients with crippling arthritis in their hospitals. We have every sympathy with sufferers from this disease and believe that much more can and should be done for them. Also, the profession may have been slow in coming to grips with this problem. However, the Department of Veterans' Affairs has not the right to lay down major policy for the whole profession even though we grant them the wisdom to do so.

THE THORNY CANCER PROGRAM

In the words of the Hon. Paul Martin the new health program is providing $3,000,000 for the provinces "to make possible a really intensive effort to lessen the ravages of cancer. This cancer program complements, but in no way supplants, the intensive research programs now under way." If diagnostic and therapeutic facilities, as planned, are to be wholly or partially free to the patient then we have something that may develop into a form of state medicine. If the pattern of practice is to change thus the doctors should have a say in re-designing it and in operating it. So far as I know the Advisory Board of the Cancer Foundation has been a vigilant watch-dog in Ontario.

Many doctors are quite pessimistic about the whole problem of cancer. In my experience of 24 years in general practice of 2 or 3 dozen patients with carcinoma of the bowel only one lived more than five years. Similar depressing figures can be matched by many men regarding various types of cancer. To say or infer that the control or cure of cancer is just around the corner is inaccurate, misleading and dangerous. We say this in order to try and preserve a balanced view, for our greatest concern is that these funds be spent to the best advantage without being swayed by the emotional appeals of groups for particular programs. We are in an era comparable to that in the field of diphtheria before the discovery

of diphtheria antitoxin and toxoid. In those days they used crude instruments to pull the membrane from the throat and applied all sorts of antiseptics and even caustics. When a specific for cancer is discovered our present mortality figures will appear even more terrible.

In this pre-specific era some of our doctors would put much of this money into research to try and lift the veil as soon as possible. Others would apply much of it to provide nursing and hospital care to make the sufferers more comfortable. Others would expand the cancer centres, with a really comprehensive campaign to educate and aid the family physician in doing more thorough work. By this we mean that the staffs of these centres might be organized so that doctors from the surrounding areas who wished to come in could do so on a sort of rotating basis and take part in the work. Or teams of experts could visit at regular intervals every group of doctors in the area and thus make the family physician an integral part of the program. If diagnosis is to be free in clinics it must also be free in the physician's office. Perhaps it could be made a notifiable disease with a good fee paid to the doctor who makes the original diagnosis. All these suggestions have been made. Perhaps all or more can be acted upon but which should get top priority?

MENTAL DISEASE

"The treatment and cure of mental diseases accounts for one-third to one-half of the hospital beds in Canada. The grants for this start at $4,000,000 and will rise over a period of years to $7,000,000 annually. They will enable medical science to move beyond institutional care and carry more active preventive campaigns against mental ill-health into the community itself. This grant also will help to meet the urgent need for more skilled workers in the field of mental health." These words by the Hon. Minister apparently were chosen carefully. The whole profession will be much interested in the expansion of this program, as it will be breaking new ground. It would appear that the profession at large will have to share much more than it has done in the management of social and psychological problems if a good job is to be done. I do not know much about the elements comprising good psychotherapy. Perhaps we can divide it into major and minor psychotherapy, and confine ourselves to a few remarks about the latter. The former is largely institutional care.

It appears to us that the wisest men in minor psychotherapy are some of our family physicians. We have many men with a sound grounding in internal medicine who have been thinking and reading for years about this subject. The program could include short courses for general physicians with an aptitude for psychotherapy and with their experience they could absorb new skills very rapidly. Such men could be put in charge of mental clinics with social workers and health nurses under them. We are pleading simply that we do not depend altogether on specialists trained solely in psychiatry. In saying this I think I interpret accurately the feeling of the general profession. Here again we fear unilateral action by departments or agencies in the formulation of new policies.

The Federal Health grants, by any standard of measurement, surely usher in a new era for the health of the people of Canada. Alone, neither health departments, nor politicians, nor the medical profession, nor the people can give us the best answers as to how to use them. In assessing our part we find we have stressed the rôle of the family physician. We believe we have not over emphasized it. The general practitioner service really is the only nation-wide network available to the ailing and injured, and if they slip through this health sieve undetected delay will be unavoidable and the cost much greater.

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ASSOCIATION NOTES

Historical Notes on Saskatoon (Concluded)

Following the 1885 rebellion Saskatoon entered upon an era of growth, despite years of drought and early frost. When crop failure supervened in the south settlers brought their stock north to seek feed and with the completion of the Qu'Appelle, Long Lake and Saskatchewan Railway it was the shipping centre for a considerable ranching business. By 1888 the "Saskatchewan Directory" showed it to have three general stores, a hotel, post office, Methodist church, a school, a physician, a dressmaker and a tin-smith. Altogether it had 12 businesses and 83 residents.

Early in 1890 the first railroad reached the settlement. Thereafter it was the terminus for traffic to and from the Battleford area. One of the most important items of freight was buffalo bones. With the return of a cycle of greater rainfall the immigration movement in the West was at flood tide by 1900. Settlers in large numbers went out in all directions, including the celebrated Barr Colonists. Saskatoon was incorporated as a town in 1903. By 1906 its population had grown to 4,500 and it received a charter as a city on May 26 of that year. On September 19, 1906 a projected municipal hospital was endorsed by public vote and was opened in 1907, the first municipally-

owned hospital in Western Canada. On March 19, 1907 St. Paul's Hospital was opened by the Sisters of Charity.

In 1909 Saskatoon was chosen as the home of the Provincial University and Sir Wilfred Laurier laid the corner-stone for the first building July 29, 1910. In 1912 the first building was opened for classes. With the establishment of a College of Engineering in 1912, a College of Law in 1913 and a School of Pharmacy in 1914 more buildings were planned. Emmanuel College building was completed in 1912, the President's residence and Saskatchewan Hall in 1913. The Presbyterian Theological Hall, now St. Andrew's College, commenced teaching in 1914. The Y.M.C.A. and Y.W.C.A. were erected in 1912.

With the onset of war in 1914 building came to a stand-still but with the armistice enrolment in the University soared to 1,487 for 1919-20. The University added the Physics Building in 1921 and the Chemistry Building in 1924. St. Andrew's College completed its building in 1923. In 1925 the Saskatchewan Anti-Tuberculosis League erected the Saskatoon Sanatorium and the University its new Engineering Building.

During 1929 the city saw the commencement of the construction of the Bessborough Hotel and of the Provincial School for the Deaf. A wing had been added to the City Hospital in 1928 and another was completed in 1931. In the depression years the only notable civic addition was the Broadway traffic bridge, one of Saskatoon's beautiful bridges. This was completed in 1932. In 1932, also, the Provincial Government established a Cancer Clinic in the City Hospital.

When, in 1939, prospects in general appeared bright the onset of war again slowed up all building, though business activity flourished as never before. With the coming of peace University enrolment again soared till in the 1946-47 term registrations totalled 10,651. A large program of extensions to the University buildings, including a Medical College and University Hospital, was commenced, which is still underway. Its effects on Saskatoon as a medical and educational centre will be incalculable. At the time of your visit you will be able to see a portion of this program in its completed form and the remainder in the earlier stages, an earnest of what the finished result will be.

Reduced Fares for Rail Travel to the Annual Meeting

The Canadian Passenger Association has authorized special convention rates for members of the Canadian Medical Association and their families travelling by rail to the Annual Meeting in Saskatoon.

Identification certificates permitting members to purchase tickets at a considerable saving may be obtained on application to the General Secretary, Canadian Medical Association, 135 St. Clair Ave. West, Toronto 5, Ontario.

Dates of Sale

Western Canada (Port Arthur, Armstrong and west), June 7 to 13 inclusive.

Eastern Canada (points east of Port Arthur and Armstrong), June 5 to 12 inclusive.

Fare Basis (Adult)

1. Going and returning same route—one and one-half of the adult normal one-way first, intermediate or coach class fare applying via route used as shown in tariffs, plus twenty-five cents.

2. Diverse routes—tickets to be sold on basis of three-quarters of the one-way first, intermediate or coach class fare, applying from starting point to destination via routes travelled on going trip, plus three-quarters of the one-way fare applying from starting point to destination via routes travelled on return trip, plus twenty-five cents.

Return Limit

Thirty days in addition to date of sale.

THE CAMSI COLUMN

One of the things a student beginning his first year as a medical undergraduate wants to know, is exactly what CAMSI does. All too often, the answer takes the form of a quotation from the constitution dealing with aims and objects. This, of course, is important but it is not usually what a student specifically requires and this matter of CAMSI activities, perhaps better than any other aspect, illustrates at once our strength and our potential weakness.

The organization is strong because of its national character; strong because its problems are those facing medical students as a whole, with resulting programs of a broad nature rather than trivialities. On the other hand, CAMSI could be weak because of the de-centralized nature of its existence.

For this reason, the National Executive, although in possession of fairly wide powers, prefers to be governed by the wishes of medical students as a whole by means of close contact with CAMSI officers in each medical school. Coupling this fact with the broad nature of national student problems, it is understandable why, although not yet endowed with the age and stature to be ponderous, CAMSI acts very slowly.

Two of our major projects which exemplify this point spring to mind immediately. They are our system of Intern Placement and our desire for the establishment of minimum standards for Intern Remuneration. These two situations bear a remarkable similarity. They have both been in the process of crystallization for some time now and strangely enough, they both fall into the category of things which appear to be desirable to all parties concerned and yet prove very difficult to organize on a concrete working basis. The National Executive this year is looking forward (as, perhaps, previous National Executives have done) to completion of both these projects. A good start has already been made, helped a great deal by ground work which has been done in earlier years.

A custom in CAMSI has always been to move the National Executive to a different school each year. This habit has grave disadvantages, as we have discovered

this year. The chief of these is the non-permanent nature of the executive. Problems continue from year to year but each year they are being tackled by different personalities and consequently by different methods. Much time is wasted during the first months in repeating work already done and in getting orientated.

Appreciating this state of affairs, the National Executive has embarked on what might be called a program within a program—that of organizing our projects in such a way that they can be taken over in short order by a new executive. This may seem quite unimportant to many, but being basic its importance cannot reasonably be denied. The feeling of the executive this year, then, is that being a continuing organization, CAMSI must achieve continuity. If our earnest desire to have both these projects solidified this year is not realized, we hope at least to hand over a clear-cut statement of the present state of these problems to the next executive.

Selflessness is a virtue much extolled but all too seldom practised. Students who are now just deciding to be doctors will benefit from CAMSI's present activities even though we may never do so materially as undergraduates. If CAMSI can reflect this attitude in its policy, we as medical students need never doubt our ability to handle even the most formidable problems.

GRAHAM BEATY

MEDICAL SOCIETIES

Medical Association of South Africa

The 37th Congress (16th Annual Scientific Meeting) of the Medical Association of South Africa will be held at the University of Cape Town from September 19 to 24, this year. Any members of our Association who may be able to visit South Africa and attend the Congress will be assured of a very hearty welcome.

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Quebéc le 19 novembre, 1948.

Traitement de l'état asthmatique par l'Isuprel. S. LeBlond et Ph. Simard.

Le chlorure de 1-(3:' 4'-Dihydroxyphenyl)-2-isopropylaminoéthanol ou Isuprel est un dérivé organique du groupe des aminés. Il a une action sympathicomimétique semblable à celle de l'adrénaline, moins brutale qu'elle cependant. Il s'adresse à l'état asthmatique plutôt qu'à la crise. Les auteurs ont traité sept cas d'asthme rebelle avec l'Isuprel en aérosols-inhalations. Ils ont obtenu de bons résultats dans 4 cas, des résultats aléatoires dans deux cas, et aucun succès dans un autre cas. L'Isuprel est un médicament qui doit entrer dans l'arsenal thérapeutique de l'Asthme. Il ne remplace pas l'adrénaline mais il y supplée et retarde ainsi les inconvénients de l'emploi prolongé de cette substance.

Greffes intra-tissulaires de peau et de derme pour la réparation des hernies. A. Jolicœur et J.-L. Petitclerc.

Il est d'abord question du pourquoi des récédives post-opératoires de hernies inguinales et des informations que l'on tirât du vaste champ d'expérience qu'offrait l'armée à ce sujet. Il est ensuite question de la réparation des récidives de hernies inguinales ou de toute autre hernie difficile que demandaient autrefois l'emploi de fascia selon le procédé de Gallie. On discute des inconvénients de ce procédé et de la substitution des greffes de peau ou de derme à l'emploi d'aponévrose. La valeur de la peau vient de l'indifférentiation de son tissu conjonctif qui est élastique et doué d'un pouvoir de métamorphose. Cela a été démontré par maints auteurs Allemands et Américains. Les inconvénients, qui seraient les dangers d'infection et le futur problématique des éléments épidermiques dans les tissus, ont été étudiés encore par plusieurs auteurs et ils ne semblent pas avoir d'importance. Les différentes méthodes de procéder sont émises et une série de 14 cas, dont 5 à l'Hôtal-Dieu et le reste à l'Hôpital des Anciens Combattants est présentée.

Syndromes anxieux. J.-C. Miller.

L'anxiété domine la pathologie mentale et somatique. Aussi apparaît-elle comme l'élément symptomatique le plus fréquent des syndromes psycho-somatiques. L'auteur rappelle d'abord les bases organiques de l'hyperémotivité anxieuse et distingue l'anxiété secondaire aux troubles somatiques. Puis viennent des considérations diagnostiques, pronostiques et thérapeutiques. La présentation de trois malades différents: associations de spasmophilie hystéroides, de phobies psychasthéniques et de mélancolie présénile, démontre que l'anxiété varie avec le terrain. En conclusion, dans toute forme d'anxiété sérieuse, le substratum anatomoclinique conserve toujours sa primordiale importance et relève de la Clinique Interne.

Les limites de la pratique psychosomatique. C.-A. Martin.

Après avoir indiqué l'importance du respect des limites de la psychiâtrie en décrivant les inconvénients qui résultent de leur outrepassement, l'auteur souligne que la médecine psychosomatique est avant tout une doctrine de l'étiologie des maladies fonctionnelles, qui sont des réactions non spécifiques au point de vue étiologique mais spécifiques de l'individu qui réagit en accord avec sa constitution innée.

Les mécanisme suivant lequel le psychisme affecte l'organisme doit être entrevu dans des limites précises. Seuls les éléments affectifs du psychisme interviennent. Le type d'émotion est spécifique du sujet qui réagit et non de la situation dont l'importance réside dans la motivation de la réaction. Les émotions par l'intermédiaire du système autonome engendrent des troubles fonctionnels. Ces derniers ne sont pas toujours psychogènes. Le choix de la maladie fonctionnelle provient de la constitution personnelle du système autonome. Les désordres du système autonome peuvent aboutir à des altérations tissulaires lésionnelles.

Les problèmes psychosomatiques sont des problèmes médicaux que exigent la collaboration de tous les médecins.

Initiatives de l'Association des Médecins de l'Est de Montréal

Lors de sa dernière séance régulière, les membres de l'Association des Médecins de l'Est de Montréal ont adopté la résolution suivante, en faveur des cours de perfectionnement pour le praticien:

"Attendu que le Collège des Médecins et Chirurgiens de la Province de Québec a le devoir de maintenir élevé le niveau scientifique et moral de la profession médicale, aussi bien chez médecins de langue anglaise que chez les médecins de langue française,

"Attendu que le Collège a dans sa charte le pouvoir de créer toutes les commissions ou comités jugés nécessaires,

"Attendu que la science médicale évolue continuellement et que le practicien le plus consciencieux n'a pas toujours le temps de se mettre au courant des nouveautés en médecine comme il le voudrait,

"Attendu que pour cette raison des cours de perfectionnement sur les actualités médico-chirurgicales sont organisés dans la plupart des pays,

"Les membres de l'Association des Médecins de l'Est ont résolu à l'unanimité, sur proposition du Dr Paul Letondal, secondée par le Dr J. E. Desrochers, de suggérer au Collège des Médecine la création d'un bureau bilingue de renseignements et d'un comité pour cours de perfectionnement, destinés à encourager et à aider nos praticiens, de langue anglaise comme de langue

française, à bénéficier de cet enseignement médical post-scolaire, tant au Canada qu'à l'étranger.''

Plus récemment les membres du nouvel Exécutif se réunissaient au Cercle Universitaire pour élaborer le programme de l'année. Etaient présents: les Drs Paul Letondal, président de l'Association; René Dionne, 1er vice-président; Gérard Rivard, 2ième vice-président; Julien Pesant, secrétaire; René Major, trésorier; L. A. Hébert, président sortant de charge; Léon Ledoux, J. E. Limoges et Origène Dufresne, directeurs. Font également partie du nouveau Conseil, les Drs Viateur Archambault, 3ième vice-président et Gaspard Morin, directeur, qui s'étaient excusés.

Au cours de cette réunion, l'on forma des comités, en particulier un comité spécial destiné à créer un mouvement en faveur de la bibliothèque de la Faculté de Médecine de l'Université de Montréal, qui est actuellement en voie de réorganisation. Durant la présente année, il y aura quatre diners-causeries et un prix sera décerné au meilleur travail sur une question de déontologie ou d'intérêt professionnel, en rapport avec l'actualité.

Montreal Medico-Chirurgical Society

The meetings of this Society in March will be as follows: March 4, Clinical Evening—Royal Victoria Hospital; March 18, Society Meeting (Jointly with Section of Gastro-Enterology). ''The Post-Cholecystectomy Syndrome'', Dr. Henry L. Bockus, Professor of Gastro-Enterology, Graduate School of Medicine, University of Philadelphia, Philadelphia.

NOTES ON GENERAL PRACTICE

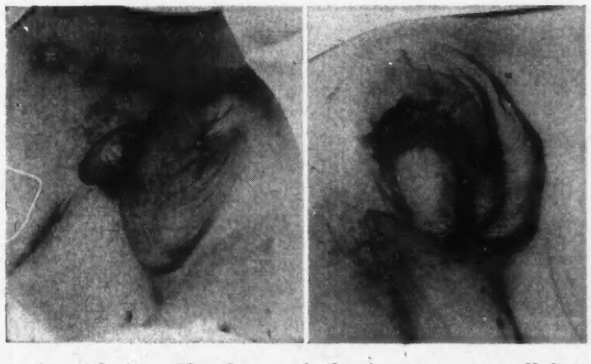
[*This column will be devoted to points concerned with general practice. Questions are welcomed. They will be answered by well qualified men. Other short contributions or notes on general practice will also be welcome. General practitioners are particularly invited to make use of the column. All communications should be signed, but the writer's name will be omitted on request.*—EDITOR.]

WOUND OF PENIS

H. D. Dalgleish, M.D.

Saskatoon, Sask.

The following unusual type of accident occurred in a 12 year old boy. He ran directly against a sharp stick which pierced the skin half way down the shaft of the penis and carried on through the scrotum taking the



penis with it. The force of the impact was sufficient to cause abrasions to the perineum. The boy was able to free himself, but the penis remained ''threaded'' through the hole in the scrotum. Under light, general anæsthetic, it was not difficult to withdraw the penis to the normal position. The right vas and testes were exposed but uninjured. The wound was closed with sutures and one drain. Recovery was uneventful.

Q. What treatment can be given in cases of frigidity in the female and impotence in the male when all œstrogenic or male hormones and all other kinds of stimulating therapy fail?

A. Frigidity in the female or impotence in the male, is undoubtedly a psychosexual abnormality. It is never due to organic lesions, unless it is secondary to pain, tenderness, or muscle spasm. Treatment with medication will therefore fail unless by the simple act of taking something, a psychic improvement results. Because of its psychosexual origin, this type of case is best treated by a trained psychiatrist. If this is not possible, the following outline may prove useful.

A careful history should be taken from the psychosexual point of view. This implies a free talk about sexual impacts from early childhood such as instruction with regard to puberty, the initial reaction to the first menses (such as fear that an injury had produced the bleeding), etc. Any abnormal sexual experience in the past should be freely discussed (exposure to exhibitionism, etc.). Questions regarding paternal relationships should be asked. Frigidity or impotence resulting from over-attachment to either parent is common. The reaction of the patient's mother toward sex is instilled often into her or him during early childhood, with permanent distortion of viewpoint and a distrust of the opposite sex. Masturbation is commonly followed by a feeling of guilt which transfers itself to the sexual act in later life, with resulting frigidity or impotence. Frank discussions over long periods of time are necessary before such past experiences can be brought to the surface and explained. The need for sufficient time is apparent. Results may be expected only if appointments can be given when time is available. With repeated discussion periods carried out along the lines enumerated above, childhood repressions are released and spontaneous improvement results of the immediate problem.

Occasionally the administration of mild sedatives before the act of intercourse have been found to be of value.

Q. What is the efficacy of aureomycin in the treatment of brucellosis? Where can one procure this product?

A. Perhaps it is too soon to be sure of the ultimate effects but so far, the treatment of human brucellosis with aureomycin, orally, is most encouraging. Spink, *et al.*, (*J. Am. M. Ass.*, **138:** 1145, 1948) report a series of 24 cases, both acute and chronic, and all with positive blood cultures in which rapid clinical recovery was the rule. Bacteriological studies are still being carried out. The toxic reactions of aureomycin are mild, the most marked being a febrile reaction with drop in blood pressure. But even this can be avoided by using only small doses to begin with. Dosage recommended is 0.1 gm. for the first day in 4 divided doses; 0.6 gm. the second day; 1.6 gm. the third; and 2.0 gm. the fourth, up to 10 days.

Aureomycin has been practically unobtainable in Canada, owing to the very limited supply, but the Lederle Company are now beginning to make it available.

Q. How long would it be safe to prescribe dexedrine sulphate to pep up a tired depressed person with no signs of organic disease?

A. Symptomatic treatment of mild depressions with dexedrine may be carried out for a few weeks with no ill effects. When the symptoms persist it is wise to consider more complete investigations by a psychiatrist and use of other methods of treatment.

Q. What is the generally accepted dosage of vitamin D for (a) infants; (b) school children; (c) adults?

What are the symptoms of overdosage (of D) and how long can one tolerate overdosage without suffering irreversible effects?

Is it harmful to give A and D alone as is commonly done or is its effect enhanced by giving it along with the other common vitamins (C and B complex).

Glen F. Hamilton, Winnipeg.

A. The generally accepted dosage of vitamin D for infants is 800 International Units of vitamin D per day. This is supplied by 1 to 1½ teaspoons of standard cod liver oil or approximately 5 drops of Oleumpercomorphum. For school children the generally accepted dosage is 400 International Units a day and for adults the generally accepted dosage is 400 International Units per day.

The symptoms of overdosage of vitamin D are anorexia, nausea and vomiting. Examination of the blood serum calcium usually indicates an elevation considerably above the normal level of approximately 10 mgm. per 100 c.c. of blood serum. I have no knowledge of how long one can tolerate overdosage without suffering irreversible effects, but it would be commonsense if the blood calcium is increased or any symptoms of overdosage are present that the administration should be stopped.

It is not harmful to give vitamins A and D alone. There is no firmly established evidence that the effect of "A" or "D" are enhanced by giving along with them vitamin C or members of the vitamin B complex. Some recent work with animals indicates there may be some relationship between vitamin A and vitamin C.

Q. What is the accepted viewpoint on the effect of high intake of alpha-tocopherols on (a) Dupuytren's contracture in hands? (b) Degenerative arteriosclerotic conditions — notably coronary sclerosis and essential hypertension? Glen F. Hamilton, Winnipeg.

A. No convincing evidence has been produced to show that high intake of alpha-tocopherols has any appreciable effect on Dupuytren's contracture. The observations by C. L. Steinberg (*Med. Clin. North America*, **30**: 221, 1946) have not been confirmed.

The effect of alpha-tocopherols on degenerative arteriosclerotic conditions, similarly, lacks convincing demonstration.

CANADIAN ARMED FORCES

News of the Medical Services

Lieut.-Col. J. N. B. Crawford, M.B.E., E.D., R.C.A.M.C. of the Directorate of Medical Services, Army Headquarters, Ottawa, has been promoted to the rank of Colonel, with effect from November 15, 1948. Colonel Crawford remains in his present post as senior consultant to the Director General of Medical Services (Army) on all professional and research problems affecting the Army.

Major R. A. Smart, Royal Army Medical Corps, who was recently detailed by the War Office as United Kingdom medical observer at Fort Churchill, Manitoba, reported to the D.G.M.S. Canadian Army, Ottawa, on December 10, 1948, and subsequently took the Arctic Indoctrination Course at Camp Shilo, Manitoba, December 12 to 21, 1948. Since then, he has taken his place with the group of United Kingdom observers at the Army clothing and equipment trials being carried out at Fort Churchill during the present winter.

Lieut.-Col. P. A. Costin, R.C.A.M.C., returned recently from a year's tour of duty in Western Europe. During this time he completed the Senior Officer's Course at the Royal Army Medical College, Millbank, was attached to the French Army for three months, and also had a period of attachment to the British Army on the Rhine. Lieut.-Col. Costin has now been appointed to replace Major J. L. Kinsman, R.C.A.M.C. Liaison Officer in the office of the Surgeon General, U.S. Army at Washington.

Major J. L. Kinsman, R.C.A.M.C. Liaison Officer in Washington, gave a lecture on "Public Health in Canada", at the George Washington University School of Medicine, on December 4, 1948, as one of a series on public health administration sponsored by the Health and Sanitation Division of the Institute of Inter-American Affairs. The latter organization had requested the services of a lecturer from the Canadian Department of Health and Welfare, who in turn arranged with the Department of National Defence to have Major Kinsman give the lecture, based on material prepared by Dr. H. A. Ansley, Assistant Director of Health Services. The D.G.M.S. (Army) has received a letter from the University, stating the lecture was one of the best in the series.

Ten Medical Officers of the Canadian Army (Active Force) attended a week's course in January on the medical aspects of atomic explosion at the U.S. Army Medical Centre, Washington, D.C.

A visit to certain northern areas by R.C.A.F. aircraft was made by Air Vice-Marshal J. L. Plant, Air Member for Personnel, R.C.A.F. He was accompanied by the Director of Health Services, R.C.A.F., Group Captain A. A. G. Corbet, Wing Commander R. R. Brown, Officer Commanding Institute of Aviation Medicine and Flight Lieutenant J. B. Hardie, Medical Staff, Institute of Aviation Medicine, and by the following civilian Consultants to the R.C.A.F.: Dr. J. W. Tice, Dr. F. F. Tisdall, Dr. A. W. Farmer and Dr. W. R. Franks. Among the places visited were Goose Bay, Labrador, Fort Chimo, Labrador and Frobisher, Baffin Land. A study was made of the medical and health problems of these areas.

Squadron Leader A. J. Barwood of the Royal Air Force Institute of Aviation Medicine, Farnborough, England, has arrived in Canada on attachment to the R.C.A.F. Institute of Aviation Medicine, Toronto. Squadron Leader Barwood is one of the outstanding medical experts in the R.A.F. in physiological development work and will be forwarding certain of his studies at different points in Canada, during his tour of duty.

Recent appointments and postings to the R.C.A.F. include S/L I. H. Barclay to the Calgary area as Senior Medical Officer; Flight Lieutenant N. St. G. Wade to R.C.A.F. Station, Clinton and Squadron Leader R. L. Walsh to R.C.A.F. Station, Trenton.

Personnel carrying out one year's postgraduate training in the noted specialties are: Wing Commander J. A. Sifton, Radiology at Ottawa Civic Hospital; Squadron Leader B. LePage, Anæsthesiology at Toronto General Hospital; Flight Lieutenant L. A. Wright, Medicine at Toronto Western Hospital and Flight Lieutenant D. O. Coons, Medicine at Hamilton General Hospital.

CORRESPONDENCE

Pain Syndromes of the Chest

To the Editor:

In the October, 1948, issue of your *Journal* Drs. J. Travell and S. H. Rinzler[1] discuss the problem of pain of muscular origin simulating heart diseases by giving rise to "cardiac pain". In referring to the literature on the subject they appear to confuse the somatic pain syndrome of the chest in general, *i.e.*, any pain localized in the chest by the patient with the main topic of their paper, *viz.*, heart pain proper. The further statement that "the customary methods of treatment (*scil.* pain of muscular origin) are often relatively unsatisfactory" do not appear to be in accordance with the objectivity customary in scientific publications. The authors "call attention to an effective method of therapy, namely local block of somatic trigger points—a term by no means defined—by means of procaine infiltration". The statement is likely to mislead the reader in regard to the originator of this therapeutic method.

In the interest of justified priority claims based on many publications in English medical journals it would, therefore, appear pertinent to draw the attention of the readers to the fact that the present writer published in 1940 in *The Lancet* a paper entitled "Idiopathic myalgia simulating visceral and other diseases."[2] Myalgia was described as a muscular disease localized in anatomical parts of a muscle and/or its appendages and characterized by referred pain and objectively localizable so called "myalgic spots". As far as heart pain is concerned two cases of myalgia of the major pectoral were described which was responsible for the syndrome of precordial pain in non-organic, so-called extrinsic, heart diseases. It was added that the cases belong to a large group of patients who consult a doctor because they fear that they have heart disease, but can without difficulty be convinced that their complaints are of extrinsic origin. It was further stated: "this form of myalgia may also be associated with organic diseases of the heart.

In this and other publications it was claimed that cardiac pain of myalgic origin could definitely be cured, *i.e.*, the pain permanently relieved by injection of 1 to 2 c.c. of procaine into each myalgic spot, provided these are diagnosed and located by objective criteria and not by subjective "tender spots".

The differential diagnosis between cardiac pain of myalgic origin and that associated with organic heart diseases appears to me to be a problem, which in the light of the new knowledge is not very difficult of a solution. In extrinsic cardiac pain, *i.e.*, in non-organic heart diseases the complaints are due to an idiopathic myalgia, which can and must be diagnosed by objective criteria. In these cases the appropriate injection of procaine relieves the pain completely. In organic heart diseases pain is a possible but not an indispensable symptom. In those patients in whom the malady is associated with precordial or other pain the presence of a myalgia or not can be decided upon objectively: presence or not of "myalgic spots". If then a myalgia can be ascertained the conclusion is justified that in this case the syndrome of heart pain is, at least partly, of muscular origin. On the other hand if a myalgia cannot objectively be ascertained the pain is most likely to be of intrinsic origin. In one respect I am in full agreement with Travell and Rinzler: in every heart disease where a myalgia is ascertainable procaine injections of the corresponding myalgic spots, but not of trigger areas which are not objectively localizable, is certainly indicated. In cases of doubt procaine injection may serve as a useful diagnostic test to decide the question conclusively whether or not the heart pain complained of is of myalgic origin. I, too, agree with the New York authors that pain in whatever part of the body it may be present has an aggravating and not rarely a devastating effect on the general health of the patient; hence the necessity to control it permanently, if possible, by appropriate treatment. In cases of pain of myalgic origin the treatment by procaine gives the quickest and greatest reward to both patient and physician.

In conclusion I should like to draw the attention of physicians to the great frequency and wide incidence of myalgias of idiopathic, traumatic and rheumatic origin. Since Hippocrates, doctors have, at all times and in all countries, been the representatives of true humanitarianism in deeming it their sacred duty to relieve human sufferings. I, therefore, appeal to the physicians of Canada to take up the diagnosis and therapy of myalgias. Let us join forces to combat and relieve one of the greatest scourges of our time, *viz.*, the disease of pain: "the day is short, the work plentiful, the workers lazy, the reward great and the Master pressing".

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2. GOOD, M. G.: *The Lancet*, **2**: 326, 1940; *The Practitioner*, **146**: 167, 1941; *Ann. Rheumat. Dis.*, **3**: 118, 1942; *J. Roy. Army Med. Corps*, **80**: 237, 1943.

The Age Factor at the Menopause

To the Editor:

We are defining the menopause as the date of the last monthly period in contra-distinction to the climacteric, which includes the menopause and the vaso-motor symptoms that accompany it.

For the last four years we have taken some interest in the age of patients at the menopause. We developed the impression that throughout the fifty odd years we have been in practice the age at menopause has been prolonged.

In 1902 we were writing a thesis on a gynæcological subject and for that reason had our histories and other data in better shape than usual. The age at menopause for women in this district at that time averaged forty-six years.

We have diamond-drilled many thousands of histories of more recent date. The age at menopause for women in this district now averages forty-nine. It is an everyday occurrence to see patients who are having their menopause at fifty-two. We are convinced this increase in age has been due to improved living conditions especially as regards diet and the fact that patients are paying more attention to their general health.

We believe that at present the climacteric symptoms are more severe and more prolonged. The present day patients are not making good progress nor are they as comfortable on œstrogens and luminal as they were in the good old days on common sense and bromides.

We could develop a long bibliography on this theme, but it seems hardly worthwhile with so trite a subject. We merely wish to bring out the fact that in our patients and in our locality in the last fifty years the average menopausal age has increased from forty-six to forty-nine years. We believe a review in future years will show a further prolongation in the menopausal age.

E. S. HICKS

Brantford Clinic,
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Dichotomy and Surgical Fees

To the Editor:

I am greatly interested in the recent discussions published in the *Journal* relating to dichotomy or fee-splitting, a dignified concealed financial arrangement between surgeon and referring doctor or by any other name, and consider the time most opportune for an expression of some points of view outside of those of the Fellows of the College of Surgery.

I refer to the Listerian Oration by Dr. Gallie in the September *Journal*, 1948, your editorial November, 1948,

and the criticism under Correspondence by Dr. C. E. Corrigan, January, 1949. For years, Mr. Editor, I have been simmering at the edge over this issue, and the above lecture, editorial and correspondence has, I am afraid, caused me to boil over and scatter the results of this heat across these pages which I would ask you to publish.

I am expressing the viewpoint of one who has been in general practice since 1912. I cannot recollect one occasion on which dichotomy was discussed in the interest of the patient, public at large or general practitioner. The professional fees for surgery are gravely and almost ridiculously too high for the amount of technical skill required. Compare the remuneration requested for one hour of professional service rendered by the proficient, highly trained internist, psychiatrist, cardiologist, etc., with that of any second rate surgeon. Eighty per cent or more of all major surgical procedures can be safely and skilfully carried out by capable, properly trained general practitioners who are conscientious and fully aware of their surgical limitations. Most of these techniques are not unduly difficult. The ethics of the Fellows of the various recognized surgical colleges regarding dichotomy is based, I am quite convinced, far more on the ego and avarice of these Fellows than on the protection of the general public or a sympathetic interest in the welfare of their fellow practitioners, be they general practitioners or fellow specialists unless they limit themselves to the wielding of the scalpel only.

Dr. Gallie states in his September oration, and you in your editorial endorse his views, only suggesting that they be extended to group practice: I quote Dr. Gallie, "This splitting of fees is a most iniquitous business, for it leads to the reference of patients in other directions than to the most competent". I entirely disagree with Dr. Gallie and would suggest that the Fellows of Surgery should make an attempt to have some reasonable standardization of their fees instead of a variance between province and province, city and city, city and suburb, and at times, office and office, differing from one hundred to two thousand dollars for the same surgical procedure. If these gentlemen would only get together and after consulting their collective conscience decide amongst themselves what a particular surgical procedure is actually worth both in time and skill, instead of what might be extracted from a grateful patient or children of such after mother has been wheeled unconscious out of the operating room, following a simple cholecystectomy or repair of a femoral hernia.

Now Sir, I have expressed my views, *i.e.*, surgery is over-estimated, over-paid and a part at least of the code of ethics of the Fellows is open to question. Some effort should be made to have these gentlemen arrange to moderate and standardize their fees and not wait to be forced into line by institutions such as the Workmen's Compensation Board, prepaid medical services, etc. Regarding dichotomy, patient-general practitioner relationship, I am thoroughly convinced, looking back through the past years, that it would be in the best interest of the patient that the surgical financing of his care be left in the hands of the family physician. A slate of all those properly qualified to perform surgery should be posted, to be called upon by the family adviser when required. One account only should be rendered to include the fees of the surgeon and general practitioner and the amount of this total fee should be decided by the family adviser until some fixed schedule or reasonable standardization is arranged.

The general practitioner, if qualified, should assist in: preoperative surgical procedures; required surgical procedures; postoperative care; follow-up of the case. A fair division of the total fee should be arranged between the surgeon and the family adviser and this division of one total fee should, if possible, be uniform with all qualified surgeons and general practitioners.

A great number of excellent and ethical surgeons would, I am sure, agree to give their services in accordance with a plan as outlined above, and again I would ask you to note, as all surgeons now do under orders from the Workmen's Compensation Board and various prepaid medical service plans.

Now the sum total of all this in my opinion, and I would hasten to point out that I am a long way from being infallible, is as follows. The total fee for the patient whose economy is known to his family doctor can be discussed and arranged before he is admitted to hospital, and this family adviser should scrutinize as carefully his ability to pay this bill as he does the surgeon he is consulting regarding his operation. Most patients under this plan would be referred to recognized and ethical surgeons, many of them members of our teaching and hospital staffs. Practitioners will not be forced to acquire surgical techniques at the expense of their patients.

Barter with surgeons who are trying to obtain a referred practice will be avoided. Practitioners will feel free to select only those whom he considers best qualified for his particular case. He will also know that his patient no matter how excellent the end results may be is not being unmercifully fleeced and driven into the hands of the psychiatrist on account of multiple doctor's bills arriving at his already greatly depleted home (hospital, x-ray, lab. expenses, etc.).

Finally for both public and profession at large it should improve the morale, ethics and integrity of us all and do away with this intolerable nonsense now being concealed under the cloak of surgical ethics.

306 Medical Arts, C. M. STRONG
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SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

HEALTH CENTRES

At long last there is definite news of the development of the health centres which have always been considered as one of the vital features of the new health service. The Central Health Services Council has appointed a committee to consider and make recommendations on the lines along which health centres should be developed. Almost simultaneously details have been announced of the first of the 162 comprehensive health centres for the County of London, each of which is to serve a population of 20,000. It is expected that the foundations of the building for this Centre will be started this month. There are to be six suites of rooms for medical practitioners, each consisting of a waiting room, consulting room, examination room and dressing cubicle, and exit lobby. In addition there will be a school health unit, child-welfare unit, antenatal unit, child-guidance unit, remedial-exercise unit, and two dental surgeries. An ultra-violet room and an x-ray room will be available to all units, and there is also a minor-operation room. Arrangements are being made to have a staff of receptionists to arrange appointments, and practitioners are to be asked to form a night rota.

It is hoped that this first Centre will be ready for use in two years. The estimated cost is £187,275.

MIDWIVES

Some two years ago the Ministry of Health set up a "Working Party" to inquire into the shortage of midwives and report on their recruitment and training. Defining the midwife as "the practitioner of normal midwifery", the report, which has just been published, recommends better conditions of service, including better working conditions and equipment, more responsibility and more opportunities for advancement. It is urged that the case load in urban areas should be reduced to 55 cases a year. At the present moment there is an absolute shortage of midwives, and this will be steadily accentuated by the fact that, among the present number of 17,000 whom it is estimated are engaged in midwifery,

there is a growing proportion of elderly women. The normal loss is estimated at 1,300, and during 1946 only 1,200 women entered midwifery and remained in it for at least a year.

The recommendations concerning training are that the training of midwives who are not registered nurses should be discontinued, but that midwives should not need to be fully trained nurses. Attention is also drawn to the tendency that has developed since the introduction of the national health service for some general practitioners to take over complete control of normal pregnancies and confinements. Whatever the theoretical arguments about this may be, there is no doubt that from the practical aspect there are not sufficient general practitioners to cope with all normal midwifery. If the mothers of the country are to be provided with an adequate maternity service, then it is incumbent that normal midwifery should be largely handed over to adequately trained midwives who will be given both time and responsibility for supervising the expectant mother from early in pregnancy until the end of the puerperium. The rôle of the medical practitioner will be to deal with the abnormal cases.

Once again the problem of the relief of pain in labour is discussed, and the report recommends that the Medical Research Council should urgently investigate the problem of "finding a safe and effective analgesic agent for midwifery and for devising for its administration apparatus that is light, simple, and requires a minimum of maintenance".

Food Poisoning

It is not for lack of evidence that so little is being done in this country to raise to a reasonable standard the conditions under which food for human consumption is handled. Two recent outbreaks can only be regarded as typical of what is all too liable to happen. In the one instance a meal of braised lamb's tongues served to over 1,000 people in a factory canteen was followed by serious symptoms in 50 employees some hours later. Investigations showed that the tongues had been contaminated by staphylococci from the hands of two of the kitchen staff.

The second outbreak was even more dramatic, though fortunately, like the first, there were no fatalities. Following a meal served at a school in Lincolnshire, 136 children were affected by food poisoning. All of these children had partaken of fish cakes, and subsequent investigation has shown the presence of staphylococci in dried egg used for preparing the fish cakes, and in nasal swabs and on the hands of workers in the "civic restaurant" where the meals for the school were prepared.

Fogs and Mortality

The fog which settled over a large part of England last November was a record on account of its duration: in London it persisted from the evening of Friday, November 26 until Wednesday, December 1. An interesting analysis by an official of the General Register Office, published in *The Lancet*, reveals that there was a sharp rise in deaths during the week of the fog. In the administrative county of London 20 to 30% more deaths were recorded during this particular week than in each of the previous four weeks, and the effect continued into the two succeeding weeks. The increased mortality was almost entirely due to respiratory infections, deaths from bronchitis and pneumonia more than doubling during the week of the fog. This increase occurred entirely in the over-45 age-groups and was greatest in the over-65 age-group. For instance, in the latter group there were 108 deaths from bronchitis and 41 from pneumonia, compared with 59 and 17 deaths in the previous week. Among the over-65's the deaths from bronchitis had returned to normal levels by the second week following the fog, but not so for pneumonia in this group. The registered mortality from pneumonia in infancy was not increased during the week of the fog (6 compared with 4 in the previous week), but rose sharply (to 19) in the week following the fog. WILLIAM A. R. THOMSON

London, February, 1949.

The Australian Letter

(From our own correspondent)

Since my last letter there have been very great developments in the government medical care situation in Australia. The National Health Services Act described previously has been passed by the House of Representatives and the Senate and has become law, despite the opposition of the British Medical Association here. The debate in the House was characterized by the Prime Minister's remarks that "there had never been in Australia anything less defensible than the doctors' attitude to the Government's health scheme". He said, "It would be a disgrace to the interests of humanity if the British Medical Association refused to co-operate with the Government," and continued "the Government wanted to give the mass of the people free medical treatment. Should a democratic government be condemned for having such an objective? Would any Opposition member be prepared to oppose it on the hustings?"

This is a fair sample of the type of discussion which took place in the House. The leaders of the two parties in opposition spoke against the measure but to no avail. The weak point in the whole piece is that the British Medical Association executives were bound to secrecy by the Minister during their protracted discussions before the bill was hatched, and when the legislation reached the floor of the House it bore little resemblance to that which they had discussed in such hushed tones for months past. Now that the bill is passed, the Minister is said to have washed his hands of further negotiations with the British Medical Association. This has been highlighted by the pronouncement of the New South Wales branch of the Nurses' Association that: "The Minister solemnly promised to call a conference of nurses' representatives before any health bill was put before the Commonwealth Parliament, and had failed to do so".

This all causes one to reflect gravely on the subject of "negotiations", and to feel that too much emphasis can be placed on this method of dealing with public questions, to the exclusion of basic education of the electorate by the medical profession.

The Federal Council of the British Medical Association has now set out the attitude of organized medicine in Australia to the Act as follows: The regulation-making powers of the Minister and his subordinates make the scheme unacceptable, and it is held that all essential conditions of service should be stated in the Act. Departmental control, rather than by a Commission, is unacceptable. The medical profession refuses to make available to any third party, lay or medical, the clinical records of patients as part of the benefits-collecting machinery. Doctors must not be bound to enter or to stay out of the scheme, but must be allowed to render service to some patients under the terms of the scheme, and to some under privately agreed terms. The profession refuses to act as agent for the patient in order to collect 50% of the fee from the Government. The patient should pay the full fee and claim a refund later from the Government. The Federal Government should pay the cost of the medical services to non-hospitalized old age and invalid pensioners and registered unemployed, upon application being made by the patient. The institution of experimental health centres by the Government is condemned as likely to replace private doctors by salaried doctors. The British Medical Association refuses to admit the right of the Government to fix a fee of which it pays only 50%, leaving the other 50% to be collected by the doctor from the patient. The British Medical Association therefore demands that a scale of benefits, not a scale of fees, should be laid down.

No further negotiations will take place between the Minister and the British Medical Association until the cardinal principles of the scheme are set out unequivo-

cally and in detail. There has been little activity for several weeks on this issue, except for a group of "younger members of the British Medical Association" in the State of Victoria. They have stated, "The British Medical Association should set about creating a better national medical service of its own devising, with group practice under self-governing groups, and with a special committee to advise in each State".

This account may serve to bring Canadians up to date on the situation here, save to say that the Minister for Health has stated that "No further delay in implementing the Government's health service plans could be tolerated". His first attention will be devoted to medical services in outback areas, training facilities for radiologists, bacteriologists and dentists, with health centres in each State to encourage group practice.

WM. C. GIBSON

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Acute Renal Insufficiency Due to Lower-Nephron Nephrosis. Strauss, M. B.: *New England J. Med.*, **239:** 693, 1948.

Acute renal insufficiency due to lower-nephron nephrosis, or hæmoglobinuric nephrosis, occurs in a large variety of conditions, including intravascular hæmolysis following transfusion reactions, blackwater fever, quinine sensitivity, transurethral prostatectomy, crush syndrome, non-traumatic muscle ischæmia, electrical injury to muscle, heat stroke, uretero-placental damage, after abortion, alkalosis from excessive vomiting, thermal burns, sulfonamide sensitivity and poisoning from a variety of agents, the most common being carbon tetrachloride.

Regardless of causation the clinical picture is identical. With or without an initial period of shock there develops nausea, vomiting, weakness, malaise, sometimes pain in the abdomen and back, followed by oliguria or anuria of sudden or insidious onset. After renal shutdown œdema generally develops, the blood pressure rises, the non-protein nitrogen steadily mounts, acidosis occurs, and death generally ensues from pulmonary œdema or, less commonly, from potassium intoxication and resultant ventricular fibrillation, flutter or arrest. Blood non-protein nitrogen levels bear little relation to prognosis since lower values are more frequent in fatal cases than in those surviving.

The first step in treatment, if shock or dehydration is present, is whole blood, plasma or saline solution. When oliguria or anuria is evident 750 c.c. of 15% glucose in distilled water is given by vein daily. This is given slowly with every precaution taken to prevent venous thrombosis. If necessary a vein is cut down upon. Nothing is given by mouth since oral food or liquid increases the liability to vomiting. Any vomitus is measured and an equal amount of physiologic saline is added to the daily amount of intravenous glucose in water. If acidosis develops a litre of one-sixth molar sodium lactate is given. Electrocardiograms are taken every second day to detect changes which may result from hyperpotassæmia. The third stage of treatment is used with the development of diuresis during the second or third week. This consists in the daily administration of water equal in volume to the urinary output plus 1,000 c.c., together with the amount of sodium chloride present in the previous day's urine. Moderate to severe anæmia is often noted during the period of diuresis and this is treated by transfusion of very carefully matched blood.

NORMAN S. SKINNER

Dicoumarol Therapy in Congestive Heart Failure. Wishart, J. H. and Chapman, C. B.: *New England J. Med.*, **239:** 701, 1948.

Thrombosis and embolic phenomena are very common in the presence of congestive heart failure. Pulmonary infarction occurs in at least 22% of cases. In an effort to prevent this complication 61 patients with definite congestive failure were prophylactically treated with dicoumarol and the incidence of pulmonary infarction was 6.5%, with only one death which might have been attributed to infarction.

Anti-coagulant therapy in congestive heart failure is considered to be of definite value in the prevention of pulmonary embolism.

NORMAN S. SKINNER

Fatal Toxic Nephrosis Following the Administration of Mercurial Diuretics. Bruno, M. S.: *New England J. Med.*, **239:** 769, 1948.

Toxic reactions following the use of mercurial diuretics are rare. Such reactions may be classified into five groups; local, allergic, sudden death, reactions due to diuretic response and mercurialism.

Local reactions at site of injection consist of burning, smarting, erythema, local histamine-like effects and an occasional sterile abscess. Allergic reactions may be mild or severe. Sensitivity is apparently related to the molecular structure of the drug as a whole since it can often be avoided by using another preparation. Sudden death from the administration of mercurial diuretics has only been reported following intravenous use, which is rarely necessary. Such an accident can be avoided by the use of small test doses. Death probably is the result of ventricular fibrillation through the mechanism of vagal stimulation. Since mercurial diuresis is the result of a block in tubular reabsorption of chloride, profuse diuresis may deplete serum chloride with an upset in the electrolytic balance. Symptoms of dehydration may occur even in the presence of peripheral œdema. Digitalis toxicity, due to the mobilization of digitalis from extracellular fluid, is probably not nearly so common following diuresis as it is generally considered to be. Kidney damage resulting from the use of organic mercurials is exceedingly uncommon and it is probable that the mercurial diuretics are well tolerated by the damaged kidney.

The only contra-indications to the use of mercurial diuretics are severe allergic reactions and oliguria or anuria as in acute glomerulo-nephritis and lower nephron nephrosis.

NORMAN S. SKINNER

Bacterial Endocarditis Following Urethral Manipulation. Meneely, J. K.: *New England J. Med.*, **239:** 708, 1948.

In the presence of chronic valvular disease of the heart prophylactic administration of chemotherapeutic or antibiotic agents should be employed prior to any manipulative procedure involving the genito-urinary tract. Two fatal cases of bacterial endocarditis are presented which followed urethral dilatation.

NORMAN S. SKINNER

Immunologic and Biochemical Studies in Infants and Children with Special Reference to Rheumatic Fever. VI. Electrophoretic Patterns of Blood Plasma and Serum in Rheumatic Children. Wilson, M. G. and Lubechez, R.: *Pædiatrics*, **2:** 577, 1948.

In rheumatic fever the observed increase in the gamma globulin fraction is sometimes offered as additional immunologic evidence of antecedent streptococcal infection, but the effect of antecendent illness has not usually been considered. In a study of the electrophoretic patterns of 79 specimens from 42 rheumatic children, the results were analyzed with respect to antecedent illness and rheumatic status. The electrophoretic patterns for rheumatic subjects who experienced neither an antecedent infection or rheumatic fever were within normal limits. Those who developed rheumatic fever but had no antecedent respiratory infection did not demon-

strate an increase in the gamma globulin component. Those with an antecedent respiratory infection, but no recurrence of rheumatic fever, showed significant elevations in the gamma component. Likewise, those with rheumatic fever developing subsequent to respiratory illness showed similar elevation of this fraction. It is considered that the observations recorded in this study demonstrate that the "elevation of the gamma globulin component is not a function of the rheumatic process but a reflection of previous infection". Apparently the rheumatic and the non-rheumatic subjects have a similar immunologic response to infections presumably streptococcal in origin. ARNOLD L. JOHNSON

Surgery

Meckel's Diverticulum. Migliaccio, A. V. and Begg, C. *Am. J. Surg.*, **76:** 188, 1948.

Meckel's diverticulum may arise from any portion of the intestinal tract, usually the terminal ileum, occurring in 1 to 2.5% of autopsies. Omphalomesenteric duct disturbances may be grouped under six headings: obstructive, inflammatory, heterotopic, umbilical, tumour, incidental. Of the 50 cases, 22 occurred in the first two decades, and 15 showed pathologic changes. Obstructive symptoms were present in 11 cases, two of which were intussusceptions with pancreatic nodules in the Meckel's diverticulum forming the leading point. In 4 cases there was volvulus around a diverticulum attached to the umbilicus. Three cases of inflammation gave a story like appendicitis. Ulceration with gastric mucosa in the diverticulum is a not infrequent cause of bleeding or perforation or ileal of obstruction by scarring. Perforation of a peptic ulcer at this site differs from a gastric or duodenal perforation in being less abrupt and less likely to show air beneath the diaphragm. In any case the diagnosis is difficult, clinically or radiologically.

The diagnosis of a complication arising from the presence of a Meckel's diverticulum should be suspected in an infant with melena, a child with recurrent attacks of abdominal pain, or in any patient whose operative findings fail to substantiate the preoperative clinical impression. BURNS PLEWES

Carcinoma of the Stomach. Moore, G. E., State, D., Hebbel, R. and Treloar, A. E.: *Surg., Gyn. & Obst.*, **87:** 513, 1948.

Since it has been suggested that only sharply localized polypoid or ulcerating carcinomas of the stomach should be resected, a series of 342 cases have been reviewed. Resections were performed in 177 of these. An analysis of the results is presented and the following conclusions reached. The presence or absence of demonstrable metastases in regional nodes among patient subjected to gastric resection for carcinoma has a greater prognostic value than does the Borrmann type of the tumour. The Borrmann type affects the prognosis of groups of cases to the extent that the limited tumours provide a proportionately large number of patients free of metastases while the infiltrating tumours which are more numerous are more likely to have metastasized.

The presence or absence of metastases cannot be accurately determined preoperatively and no patient should be denied operation because of the type of tumour he may be determined to have. BURNS PLEWES

Inflammatory Carcinoma of the Breast. Meyer, A. C., Dockerty, M. B. and Harrington, S. W.: *Surg., Gyn. & Obst.*, **87:** 417, 1948.

Of 7,000 consecutive cases of malignant lesions of the breast, 74 showed generalized redness and œdema, and of these, 65 were studied since suitable sections were available. Thus the incidence of inflammatory carcinoma is 1% in the Mayo Clinic series. The youngest patient was 32 and the oldest 72, average 52.6 years. The left breast was affected twice as often as the right; 13% had bilateral carcinoma of the breast. Out of the 74 patients, 24 had never been pregnant; 19% were diagnosed as inflammatory disease before carcinoma was discovered. Most patients did not notice a lump, and in 45% a lump was not clinically palpable; 53% had pain at some time and in 26% pain was the first symptom. The nipple was retracted in 54%. Ulceration of the skin was rare. Mastectomy was performed in 63 of the 74 patients and the radical operation was followed by irradiation. The most common site of metastasis was the skin.

Spread is by both lymphatics and blood vessels. There was no evidence that infection had anything to do with the clinical appearance in any of the cases. Prognosis is poor, and palliation is recommended by most. But because 3 of the patients in this series survived for 5 years, radical mastectomy for cases that have not obviously spread beyond the limits of excision is recommended. BURNS PLEWES

Late Joint Changes as a Result of Internal Derangements of the Knee. Ghormley, R. K.: *Am. J. Surg.*, **76:** 496, 1948.

Internal derangements of the knee should be corrected early because of the changes which follow the initial damage. The articular cartilage is vulnerable to trauma and has poor power of repair so that irreparable damage if often present after a considerable period of derangement. This is true after repeated lockings due to torn menisci. Erosion of cartilage is caused by the larger cysts of semilunar cartilages. Loose bodies from osteochondritis dissecans damage cartilage at each locking and erosion occurs at the irregular site or origin. Similarly chondromatosis may damage by loose bodies and lockings. Chondromalacia of the patella may necessitate patellectomy when advanced for damage of femoral articular cartilage is a sequel. Similar changes occur as a complication of recurring dislocation of the patella. Acute and chronic traumatic synovitis, infections and rheumatoid synovitis, intermittent hydrarthosis, and the synovitis secondary to tumours and hæmophilia, all may lead to joint surface damage. Fractures about the knee and torn ligaments obviously may lead to abnormal strains and pressures. A well developed quadriceps mechanism delays and minimizes these articular changes.

Loose bodies or synovectomy done reasonably early, development of a stable knee by muscle exercise, avoiding strenuous activities and reduction in body weight minimize late serious joint changes. BURNS PLEWES

Traumatic Rupture of the Gallbladder and Liver. Newell, C. E.: *Am. J. Surg.*, **76:** 466, 1948.

A case of ruptured liver and gallbladder recovered after operation 66 hours after the accident and the removal of three pints of bile from the peritoneal cavity, cholecystectomy and suture of the liver. The diagnosis of ruptured liver is difficult. If signs of intra-abdominal hæmorrhage with pain and tenderness in the right upper quadrant are found, rupture of the liver should be suspected. It is hard to differentiate it from retroperitoneal hæmatoma or ruptured spleen.

Rupture of the gallbladder without a penetrating wound is rare and only 33 cases are found in the literature. Generalized bile peritonitis is rapidly lethal, probably because of the ascites it causes and the frequency of infection. Mild jaundice often develops. Since 1898 every patient with ruptured gallbladder that was operated upon recovered.

The mortality rate for ruptured liver operated upon is about 40%. Surgery should be deferred for the treatment of shock and for possible spontaneous cessation of hæmorrhage. Simple mattress suturing and/or the use of one of the absorbable hæmostatic materials seems more successful than packing with material that has to be removed. Any free masses of liver substance should be removed. BURNS PLEWES

Rôle of Chemotherapy in Wounds and Surgical Infections. Ackman, D. and Smith, F.: *Am. J. Surg.*, **76:** 483, 1948.

In a careful clinical and bacteriological study of wounds and burns, several conclusions regarding Gram-negative bacteria were reached. Gram-negative pathogens are infrequent contaminants in fresh trauma and occur mostly in lesions of the lower extremity. When present they tend to persist till healing, but rarely invade, and wound revision including grafting may be proceeded with impunity providing the circulation is satisfactory. The physiological conditions desirable for satisfactory healing are best maintained by occlusive pressure dressings infrequently changed. There was no evidence of symbiosis between Gram-negative and Gram-positive organisms in this series. Neither sulfathiazol, nor penicillin nor streptomycin creams eliminated Gram-negative organisms when present and streptomycin cream regularly caused "fast" organisms. Intramuscular streptomycin was effective when Gram-negative bacilli did invade tissues.

BURNS PLEWES

The Problem of Foreign Bodies in the Colon and Rectum. ReBell, F. G.: *Am. J. Surg.*, **76:** 678, 1948.

In reviewing the problems presented in a series of cases of foreign bodies in the rectum and colon the removal is described of objects ranging from toothpicks to carrots and whisky bottles. A warning is made regarding the forcible or deep insertion of rectal thermometers. When erosion or eruption into the abdominal cavity occurs surgical intervention within 6 hours is mandatory. Palpation and proctoscopic examination makes the diagnosis clear in most cases; x-ray study is often valuable. Perianal discharges of unexplained origin, sudden changes in bowel habits, as well as acute abdominal symptoms, call for thorough proctologic examination on the basis of a carefully collected history. The ingenious methods used to remove the foreign bodies varied with each circumstance.

BURNS PLEWES

Choice of Operation in Carcinoma of the Left Half of the Large Bowel. McNealy, R. W. and Wolfe, F. D.: *Am. J. Surg.*, **76:** 646, 1948.

Primary anastomosis must never be attempted in the presence of the slightest obstruction. Interrupted fine non-absorbable sutures, avoiding crushing of colon ends to be anastomosed, normal blood protein and vitamin levels, adequate mesenteric blood supply, clinical biostatics, all make operation safer. Gastric decompression for 8 to 10 days and a short rectal tube make postoperative management smoother. Fluoroscopic examination before operation will prevent surgery on a patient with barium or inspissated fæces still in the colon. Sometimes the bowel proximal to the obstructing lesion can be washed out via a catheter introduced past the carcinoma through a sigmoidoscope. The Mikulicz procedure should never be used in the presence of any distension.

Carcinoma near the peritoneal reflection should be managed by abdominoperineal resection. If obstruction exists a primary colostomy is necessary. Sleeve resections and pull-through operations have the advantage of a normal location of the stoma, a certain amount of sphincter control and a smaller percentage of impotencies, but these advantages are of secondary importance. A great effort is made to remove the primary in spite of metastases being present, but when adjacent pelvic structures are involved a colostomy only is done.

In 266 cases, 7% had a colostomy only, 70% had abdominoperineal resection, 19% a primary anastomosis, 0.4% a Mikulicz, and 3.4% refused treatment.

BURNS PLEWES

Colloid Adenocarcinoma Involving the Perianal Region, Anus, Rectum or Sigmoid Colon. Hill, J. R. and Smith, N. D.: *Am. J. Surg.*, **76:** 642, 1948.

Diagnosis is a greater problem when colloid is present. The patients are often under forty, and 6 out of 38 were under thirty. The malignant lesion sometimes occurs in a fistula or may simulate a benign inflammatory lesion such as a stricture. Colloid adenocarcinoma was diagnosed variously as diverticulitis, rectovaginal abscess, tuberculous ulcer and ulcerative colitis before biopsy. Yet early diagnosis is very important, for half the Mayo Clinic patients were dead within a year of making the diagnosis. Colloid adenocarcinoma invades directly into the surrounding tissue. Biopsy from the edge of the lesion may show only inflammatory reaction, so if one biopsy is reported benign, another should be taken promptly when malignant changes are suspected. It seems inexcusable for a surgeon to operate upon any anorectal pathologic process before a proctoscopic examination. No matter how early the diagnosis is made, surgical intervention must be radical. BURNS PLEWES

Anæsthesia

Rectal Sodium Pentothal in 2,500 Anæsthesias. Weinstein, M. L. and Light, G. A.: *Current Res. Anæs. & Analgesia*, **27:** 343, 1948.

The authors report 2,500 administrations of rectal sodium pentothal as a basal anæsthesia with no untoward results. The sedation produced is similar to that of avertin but more nearly resembles normal sleep. It is less toxic than avertin and there are fewer contraindications to its use. There are apparently no toxic effects on the liver or kidneys. It is definitely shorter acting and less depressing to the respiration and to the cardiovascular system than is avertin. The preparation of the solution is a much simpler procedure than in the case of avertin. A preoperative enema six to twelve hours before anæsthesia is desirable but not absolutely necessary, as in the case of avertin.

The patient should receive the usual premedication dose of atropine, hypodermically, as before intravenous pentothal. This should be given one and one-half hours before the administration of rectal sodium pentothal, Morphine is avoided. A preparatory enema at least six hours before is desirable. The dosage employed is 1 gram of pentothal per 50 lb. of body weight, dissolved in from 10 to 30 c.c. of lukewarm tap water. The authors consider 4 grams of pentothal to be the maximum single dose. Thus if a patient weighs over 200 lb. he still would receive only 4 grams of sodium pentothal rectally.

The dose decided upon is dissolved in 10 to 30 c.c. of lukewarm tap water and instilled into the rectum through a plain catheter by use of a small syringe. The initial dose may safely be supplemented by small additional doses if necessary preferably in one-half to one hour following the initial dose. In the case of hyperthyroid patients and in small children, in whom the dose is frequently underestimated, the supplemental dose is given as soon as fifteen minutes after the initial dose with no untoward results.

The effects of rectal sodium pentothal begin five to fifteen minutes after its instillation. The patient must be watched to avoid obstruction of the upper air passages as relaxation of the jaw and tongue may occur. An oral airway should be within reach, and it is advisable to have oxygen and suction available as well although they are very seldom needed. In the case of over-dosage, oxygen should be administered at once and the analeptics, coramine, picrotoxin or metrazol might also be given. In 2,500 cases the authors have not needed to employ any drug as an antidote. The basal anæsthesia afforded by rectal sodium pentothal may conveniently be supplemented by any of the commoner anæsthetic agents to afford a satisfactory surgical anæsthesia for almost any type of operation.

F. ARTHUR H. WILKINSON

Dermatology

Rôle of Sulfhydryl Compounds in Pigmentation. Fleshch, P. and Rothman, S.: *Science*, **108:** 505, 1948.

It has been found that aqueous extracts of human epidermis inhibit the familiar dopa reaction which produces melanin, and evidence points to the sulfhydryl compounds in the epidermal extracts as being the inhibiting agent. This inhibitory principle is water soluble, dialyzable, thermostable and counteracted by cupric ions. The degree of inhibition of melanin formation by the epidermal extracts varies directly as the logarithm of the molar concentration of –SH. Following ultraviolet irradiation of the skin a similar reaction occurs, the increase in melanin formation being preceded by a decrease in the –SH content of the skin, suggesting that pigment-producing stimuli act by eliminating the –SH inhibition. Another defense mechanism of the skin, increased keratin production in human skin and excessive hair growth in animals, is characterized by the formation of disulfide bridges from sulfhydryl groups of native proteins. It is thus considered possible that the same process, the oxidation of sulfhydryl groups to disulfides, is responsible for both intensified hyperkeratinization and pigmentation.

Tyrosinase, a copper-containing enzyme is apparently essential for melanin formation in mammals, while copper is an essential dietary factor in maintaining fur colour. It has also been shown that the epidermal extract neutralizes the effect of both tyrosinase and cupric ions in pigment production. The workers in the Section of Dermatology in the Departments of Pharmacology and Medicine of the University of Chicago, therefore conclude that a balance is maintained within resting melanoblasts between sulfhydryl compounds and a copper-containing enzyme, and this equilibrium is disturbed under the action of pigment-producing stimuli, such as radiation, by the oxidation of the –SH groups, enabling the enzyme to act freely on the substrate and form pigment. D. E. H. CLEVELAND

Obstetrics and Gynæcology

Non-operative Treatment of Urinary Incontinence in Women. Rashbaum, M. and Mandelbaum, C. C.: *Am. J. Obst. & Gyn.*, **56:** 777, 1948.

False incontinence due to irritative lesions of the urethra, vesical neck, and bladder is frequently encountered in women. False incontinence is often confused by the doctor and patient and considered to be stress incontinence. The two conditions may co-exist. No adequate tests have been described to differentiate these two types of incontinence. The so-called incontinence test cannot be used as a reliable index to measure incontinence. It has been found that dilatation of the urethra, topical applications of silver nitrate, and the use of ephedrine, will usually cure false incontinence. The method described may be used, therefore, as a therapeutic test to differentiate false from true stress incontinence prior to surgery.

This method at times may be used successfully in preventing unnecessary operations on patients with false incontinence, and in the salvage of patients suffering from incontinence unimproved by surgery; or following operations on the anterior vaginal wall. Of 68 cases of urinary incontinence with adequate therapy and follow-up, 27 (or 40%) were cured; 28 (or 41%) were improved, while 13 (or 19%) were not helped by this form of therapy. ROSS MITCHELL

The Rooming-In Plan for Mothers and Infants. Thoms, H., Jackson, E. B., Stoew, L. M., and Goodrich, F. W.: *Am. J. Obst. & Gyn.*, **56:** 707, 1948.

Rooming-in is a term applied to that form of hospitalization in which the mother and newborn infant room together and the mother takes as much care of the baby as possible. It seems likely that there will be an increased demand for this kind of hospitalization on the part of both the laity and the profession. The ways in which such demand may be met may involve changes in present hospital and nursing arrangements and in planning for new construction. Some hospitals at present are planning for both rooming-in and regular nursery care.

From the obstetric standpoint, the experience at the Grace New Haven Community Hospital does not appear to have any disadvantages so far as the health of the mother and child is concerned. Among the important advantages are a natural mother and child and family relationship, and the emphasis on the values of breast feeding and the self-demand schedule. ROSS MITCHELL

Placenta Prævia Accreta. Chisholm, W. N.: *J. Obst. & Gyn. Brit. Emp.*, **55:** 472, 1948.

The difficulty of a case such as the one described is that the diagnosis cannot be made until attempts have been made to remove the placenta at the time of the section, and by this time partial separation has occurred because of the siting of the placenta on the lower segment, and, as happened in this case, the patient's condition will have deteriorated. The decision to adopt an expectant attitude, prepared to do a hysterectomy should the occasion arise, enables the patient's condition to be restored and also affords a slight chance of saving the uterus. If a placenta accreta is situated on the upper segment there seems no doubt that the proper treatment is either an immediate hysterectomy or to leave it alone to be absorbed. In Irving and Hertig's series all the patients died when manual removal was attempted.

Placenta accreta situated on the lower segment is a more difficult problem, in that usually partial separation has occurred. In cases where the fixation of the placenta is so extreme, as it was in the present case, the only safe treatment is hysterectomy as soon as the patient's condition justifies it. In minor degrees it might be possible to detach the placenta—such a course would always incur the risk of a formidable blood loss.

P. J. KEARNS

Angina of Effort in Pregnancy. Schott, A.: *J. Obst. & Gyn. Brit. Emp.*, **55:** 430, 1948.

While many different kinds of precordial pain are encountered in pregnant women, the number of cases in which a diagnosis of angina pectoris due to coronary disease can be made with any degree of certainty is exceedingly small. This is easily understood if the great rarity of coronary disease in women under 40 is remembered. In all age-groups considered together, the average ratio of male to female patients with coronary disease is about 4:1, whereas in a series of 100 patients under 40 the ratio was 24:1. Of the 4 women described by these authors 3 had hypertension and only 1 had a normal blood-pressure. The frequency with which cardiac neurosis was superimposed on the organic lesion was emphasized. This pronounced predominance of males with coronary disease in the under-forties is also borne out by Clawson's (1941) investigation on the incidence of types of heart disease among 30,265 autopsies: his figures for the 4th decade were 18 males with coronary sclerosis without hypertension in 2,052 autopsies as compared with 1 female in 1,283, giving the statistically significant difference of an incidence of 0.8 per 1,000 in females as compared with 8.8 per 1,000 in males. P. J. KEARNS

Pregnancy Associated with Congenital Abnormalities. Burton-Brown, J.: *J. Obst. & Gyn. Brit. Emp.*, **55:** 421, 1948.

Here is a case of a woman with a septate uterus and vagina entering the 5th month of pregnancy without unusual symptoms. The presentation was a vertex and it seems likely, owing to the uterine septum, that the baby would have remained in this position. The placenta was situated on the fundus of the right uterus and not on the septum, so that risk of abortion was minimized. The

signs which aroused suspicion of pelvic deformity were the small stature and characteristic limp. The renal abnormality with impaired function was the point on which the whole treatment of the case rested, for congenital abnormalities of the kidney predispose to nephritis, formation of calculi and pyelonephritis and, according to Gutierriz (1833), this is particularly so in the condition of solitary kidney.

It is interesting to note that in this case, although only a small septum divided the uterus to produce 2 similar organs, yet the hypertrophy of the uterus containing the fetus and placenta quite overshadowed the hypertrophy brought about by hormonal influences in the other, where, although there was a well-formed decidua, the thickness of the wall was approximately half that of the pregnant organ. The possibility that various developmental defects may co-exist is shown in this case by the abnormalities found in the pelvic girdle, rectum, kidney, ureter and uterus. P. J. KEARNS

A Further Case of Stromal Endometriosis. Park, W. W.: *J. Obst. & Gyn. Brit. Emp.*, **55:** 426, 1948.

These findings are very similar to those of cases reported by previous writers. An interesting addition is the canalization of some of the branches which make up the arborescent pattern. A similar pattern was noted by Dougal (1926) and by Goodall in one of his cases (1940) but neither author reported canalization. If it is accepted that this finding can reasonably be interpreted as early epithelial gland formation, it establishes a closer identity of the abnormal tissue with endometrium than has been possible so far, since in none of the previous cases has there been evidence of any epitheliogenesis in the permeating stromatous tissue. Identification of the constituent cells with endometrial stroma has so far had to be based on morphological appearances alone.

Yet this glanduliform differentiation does not constitute proof that the tumour tissue is derived directly from endometrium by invasion or embolism. There remains at least the possibility that the tumour tissue and endometrium have a common ancestor and that the process is a neoplasm proper having its origin in partly differentiating tissue of embryonic bipotency lying indiscriminately throughout the uterus, tissue which in the course of normal development becomes restricted in situation to the inner surface of the uterus, and in function to the formation of endometrial glands and stoma. P. J. KEARNS

Industrial Medicine

Cardiac Rehabilitation in a Sheltered Workshop. Klapper, M.: *Indust. Med.*, **17:** 337, 1948.

Since its inception in 1915, the sheltered workshop program for rehabilitation of dischargees from tuberculosis sanatoria, as carried out by the Altro Work Shops Inc., has gained an international reputation. During these 33 years this organization operated on a non-sectarian basis by the Committee for the Care of the Jewish Tuberculous, has demonstrated that the tuberculous dischargees from a sanatorium can be helped medically, socially, psychologically and economically to take his place as a fully functioning member of society. This organization considers itself primarily a hardening centre and secondarily a training centre. The arrested tuberculous patient starts working three hours a day. His pay scale is at least equivalent to that prevailing in private industry. His daily work tolerance increases, dependent upon the prescription of the physician in charge. Although the jobs at Altro pertain to the garment industry, it was demonstrated that only 17% of Altro graduates remained in that industry.

More recently Altro has instituted a program of cardiac rehabilitation, in the belief that this sheltered workshop may be proved to be applicable to the rehabilitation needs of the cardiac. Previous studies and reports together with the personal experience of countless cardiologists engaged in the medical supervision of their working patients are convincing evidence of the workability to greater or lesser degree, of various types of cardiac patients. There are nevertheless many problems still to be solved: the daily work tolerance for various cardiac types, the occupational and employment possibilities, the non-medical services essential during rehabilitation and, the effect of certain types of employment on the course of heart disease.

The author of this article presents the story of the pilot study begun by the Altro Work Shops, Inc., on February 9, 1948. Owing to the scarcity of experience on this problem of cardiac rehabilitation it was thought wise to start with a program on a smaller scale than the present one for the tuberculous. It was felt that the results of such a study would help guide the establishment of a larger cardiac program in the future. It would also serve as an initial test of the value of the sheltered workshop to the cardiac patient. At any one time, not more than 20 male patients, aged 18 to 50 will be accepted; over a two-year period, approximately 75 will be accommodated. The age group selected was decided upon because it would yield a group with greatest possibility for rehabilitation. All diagnostic types are considered for acceptance, except luetics; the prognosis for these is poor. The patient must be a bona fide cardiac case uncomplicated by another major disability. All referred patients are examined by the Altro cardiologist for diagnosis, classification and work prescription. The important consideration is whether his physical capacity upon admission permits a three or a four hour daily work tolerance. As in the case of the tuberculous patient, the program of physical hardening is combined with vocational training. A social worker is available when necessary to help with social emotional and economic needs of the patients and their families. A Medical Advisory Committee whose members have a high reputation in the cardiological and medical field, has been established. This committee is available for expert guidance. MARGARET H. WILTON

The Accident-Prone Patient. Gleason, M. N.: *New York J. Med.*, **48:** 19, 2168, 1948.

That repeated accidents are symptoms of physical and emotional disorders, which in many cases, can be diagnosed and treated clinically, is now widely recognized. The author traces the development of this concept from the first scientific study of the accident-prone personality, which was undertaken in England in 1919. By this investigation it was established that about 20% of the people have most of the accidents while the remaining 80% are comparatively accident safe. Subsequent studies have produced findings in agreement with this and to date much has been written on the subject of accident proneness.

Out of this awareness of the problem has come the science of accident hygiene, based on recognition of the fact that an accident prone patient presents a sociologic as well as a medical and psychiatric problem. Very recently a clinical psychiatrist of the University of Rochester School of Medicine and Dentistry suggested that "a complete medical, psychological, and neurological examination given to accident repeaters, especially children might reveal not only the disorders of which the accidents are symptoms but other hidden disorders as well". This idea has prompted considerable discussion among various specialists regarding establishment of medical accident clinics. In addition to the routine pædiatric and medical examination, special consideration has been given to the use of instruments such as orthorater, sight tester, and audiometer, which can be operated by trained laymen to detect certain defects contributing to accident proneness. Reference is made also to the relation between accidents and other conditions as: postural defects, illness and use of therapeutic drugs. It is stated that bromide poisoning may keep a patient accident prone for from 3 to 4 months.

MARGARET H. WILTON

OBITUARIES

Dr. Edmond Bourque died suddenly of a heart attack on January 14 in Ottawa. Born in Montreal in 1877, he came to Ottawa in 1901 following his medical studies at Laval University from which he graduated. Despite a busy medical career he found time to devote himself to politics and in 1925 was an unsuccessful candidate in the federal field for the Progressive party. Dr. Bourque was interested keenly in civic affairs and took an active part in community welfare work. He was on the staff of both the Ottawa Civic and General Hospitals where his talents and experience were of great value. In addition he was a past president of the Medical Society.

Surviving, besides his widow, are five daughters and two sons.

Dr. John Wesley Brien died on January 11 at his home in Essex, Ont., where he practised most of his active career. He was 84 years old. Born November 24, 1864 in Victoria County, Ontario, Dr. Brien was an outstanding citizen as well as a noted doctor. He is remembered for example as the central figure in the famous election of 1917 in Essex South when he was the union government candidate against the late Robert Atkin. When first returns came in the Liberal, Bob Atkin was declared elected, but the soldier vote from overseas changed the picture and Dr. Brien was declared the winner and he represented the riding until 1921. In the first world war he was medical officer with the Canadian Expeditionary Force. He graduated from Trinity Medical College with honours. He was a familiar figure on the roads of the county long before the automobile. A lover of horses and dogs he was particularly proud of his smartly turned out buggy along side of which, two dogs often ran, when the doctor was making his calls. He is survived by his widow and a brother.

Dr. James Archer Brown died at his residence in Oshawa, Ont., on December 21, in his 67th year. Born at Colborne on January 18, 1882, he received his early education at Colborne and later attended Trinity Medical College where he graduated with a silver medal. Dr. Brown commenced his practice at Todmorden, Yorks, England, and was later at Blackwood, Monmouthshire, England. He then practised at Colborne, Ontario, for a time before coming to Oshawa in 1929. He was a member of Christ Memorial Anglican Church, a former member of the Oshawa Kiwanis Club and of the Oshawa Golf Club. He is survived by one son, a sister, and two brothers.

Dr Jos.-N. Chaussé, radiologiste, est décédé à Montréal, à l'âge de 61 ans. Il était l'ancien radiologiste de l'Institut Bruchési. Il laisse son épouse; deux frères, et deux sœurs.

Dr. Charles Thomas Crowdy died on January 9. Born in St. John's, Nfld., he was educated at Bishop Field School there and later at Franlingham School, England. Graduating in medicine at McGill University in 1913, he was for a time a lecturer in pathology at the university. Dr. Crowdy practised in Montreal West from graduation and was on the consulting staff of the Catherine Booth Hospital and on the visiting staff of the Royal Victoria Hospital. He leaves a widow and three daughters.

Dr. William L. Ellis, aged 77, died at the General Hospital, Saint John, N.B., on January 13, after an illness of only a few days. During his earlier years, he was immigration physician at the port of Saint John, with headquarters here, although his work took him to Halifax and Quebec. He was superannuated from this post some 20 years ago. He is survived by his widow, three sons, three daughters and one sister.

Dr. Joseph Holdcroft, aged 82, of Havelock, Ont., died January 9 in the Civic Hospital, Peterborough, following an emergency operation.

He began his medical career at the Royal Medical School, Kingston, and later at Queen's University. At Havelock he served five generations as family physician, surgeon and friend, often enduring many hardships attending patients in the days of the horse and buggy.

Early in the 1900's he started stocking every stream within 12 miles of Havelock with Government trout fingerlings, all except one. This, known as Belpraine Creek, he had leased from the farmer-owner until the present day as his private trout stream. It was here that Mrs. Holdcroft caught a four-pound two-ounce squaretail speckle, a challenge yet to be beaten. Surviving, besides his widow, are three sons and a sister.

Dr. John Garnet Hunt died suddenly on January 14 at his home in London, Ont. Dr. Hunt was a member of one of London's pioneer families, a graduate of the University of Toronto, a veteran of World War I, a charter member of the London Kiwanis Club and was active in the work of St. Paul's Cathedral. After graduating from the University of Toronto he practised in Fort William until World War I. He was officer in charge of eye, ear, nose and throat treatment at No. 1 Canadian General Hospital at Etaples, France. He later served in Russia with a British hospital unit.

For 16 years, Dr. Hunt was a member of the London Board of Education. Three times, the last in 1948, he was chairman of the board. He was also chairman three times of the Advisory Vocational Committee of the board in charge of the H. B. Beal Technical School. He was predeceased by his two children, a daughter, Merlie, who died in the flu epidemic of 1918, and a son, John Blair, who was killed in action in Italy during World War II. Surviving is his widow.

Dr. Joseph William Lord, aged 67, of Gordon Head, Victoria, died January 1. Born in London, Ont., Dr. Lord practised at Eatonia and Kindersley, Sask. He was an honorary life member and past master of Kindersley A.F. & A.M. lodge and an honorary life member of the Physicians and Surgeons' association of Saskatchewan. He served three years overseas with the R.C.A.M.C. and with the British field ambulance in the First World War. Surviving besides his widow is a daughter.

Dr. Joseph Alexander MacDonald, aged 58, died on December 23 at Englehart, Ont., following a short illness. A graduate of the University of Toronto and other medical schools, Dr. MacDonald practised in Hastings for many years. He was a member of Mount Carmel Church. He is survived by six daughters and two sons.

Dr. Kenneth L. MacKinnon died in the Kingston General Hospital New Year's Eve. Born in Renfrew 57 years ago, he attended Renfrew Public School and Renfrew Collegiate. He graduated from Queen's University in 1914. At the outbreak of the First World War, he joined the Canadian Army and served overseas with distinction with the British Army Medical Corps. He was a member of the Renfrew Curling Club, the Rotary Club, the Masonic Order, the Canadian Legion, and was on the staff of the Renfrew Victoria Hospital. A hockey enthusiast, Dr. MacKinnon took an active interest in sports and was a backer of Renfrew junior hockey teams. He retired from active practice in Renfrew in 1946 and since then had been a resident of Napanee. Surviving are his widow, three sons and one daughter.

Dr. Francis Lucas Nesbitt, aged 81, died on January 17 at his home in Toronto. Dr Nesbitt was the son of the late Dr. F. L. and Mrs. Nesbitt of Angus. He attended Barrie High School and the University of Toronto, and graduated in medicine from the Univer-

sity of Louisville, Ky. He was a former member of the staff of the Johns-Hopkins Hospital, Baltimore. He was a member of Corinthian Lodge, AF & AM, Barrie. Surviving is a sister.

Dr. George Arthur Price died on December 11 in Victoria, B.C., at age 85. Dr. Price came to Canada in 1910 and settled at Cowichan. He came to Victoria late in 1916 and was health officer from that time until he retired in 1929. Born in Dublin, Ireland, he attended Rathmines School there and graduated in medicine from Trinity College, Dublin, in 1888. He was a gold medalist student. Surviving are one son, and two grandsons.

Dr. Gordon E. Richards died of leukæmia on January 13, in Toronto. He was born in Lyn, Ont., in March, 1885, the son of Rev. J. J. Richards and Anna Paul. He matriculated from Athens High School and graduated M.B. University of Toronto in 1908 with the gold medal. He went to British Columbia and practiced in Prince Rupert and Stewart until 1919 when he moved to New York to study radiology. He joined the staff of St. Paul's Hospital, Vancouver and in 1915 he went overseas and served with the British forces in the Mediterranean area. In 1917 he came to Toronto and was appointed radiologist to Toronto General Hospital. This was the beginning of a distinguished career. He applied himself diligently to mastering the physics of radiant energy and its application to the treatment of malignant disease. In this work he ranks among the pioneers.

The Ontario Institute of Radio-therapy gave him his opportunity and, over twenty years ago, he had the first high voltage treatment machine and the largest supply of radium in Canada to work with. He was tireless in his efforts to perfect methods and his criteria of successful treatment were rigid and high. Over the years he trained many radiologists and they have carried his methods and his zeal for research far and wide.

Dr. Richards won many honours. He was Director of the Ontario Cancer Foundation, Fellow of the Royal College of Physicians of Canada, Honorary Member of the Royal Society of Medicine and Fellow of the American College of Radiology. He was Skinner Lecturer to the Faculty of Radiology in London in 1948 and represented Canada in the World Conference in Cancer Research in 1947. In 1946 he was granted the honorary degree of LL.D. by Queen's University.

Dr. Richards had an unusual amount of what Crile called "the kinetic drive". His hobby was work and his ideal was work carried to perfection. He had a strong personality and was esteemed by his staff and his associates. His patients loved him. His lectures and his published papers were lucid and convincing and his teachings will long survive him. He never had time for social relaxation but he was faithful to his upbringing in his loyalty to his church.

Dr. Richards is survived by his widow and by two sons, Dr. Alan Richards and Donald. Another son, Gordon, was killed while serving in the Canadian Air Force during the war.

Dr. Seymour Ross, aged 61, died on January 9 in Windsor, Ont., after a long illness. He was an eye, ear, nose and throat specialist. Born in London, Ontario, he graduated from Western University with the M.D. degree in 1911. He practised in Regina until 1917, when he joined the Royal Canadian Medical Corps. He served in Canada for a time and then went overseas, as a captain in the R.C.A.M.C. In England he served with the 22nd (Cavalry) Field Ambulance. He was on the staff of the Canadian Convalescent Hospital at Epsom, the 12th Canadian General Hospital at Bramshott, and the Canadian Special Hospital at Whitby. After his discharge in 1919 he set up practice in Windsor. He was a member of the Essex County Medical Association. He is survived by his sister.

Dr. Wallace A. Scott died of a retroperitoneal hæmorrhage on January 5, aged 75. Born in Ottawa, Dr. Scott graduated in Arts and Medicine from the University of Toronto, taking his M.B. in 1898. In 1928 he was awarded the M.D. degree. He spent several years in postgraduate study in England and took his Fellowship in the Royal College of Surgeons of England in 1904. On his return he joined the staff of St. Michael's Hospital and began his long service as a teacher of surgery in the University of Toronto. He was made a consulting surgeon to St. Michael's after his retirement a few years ago. He was a Charter Member of the Academy of Medicine, Toronto, also a Member of the Canadian Association of Clinical Surgeons and of the Senate of the University of Toronto. From his youth Dr. Scott was a soldier. In World War I he volunteered the day that war was declared. He served in France with the rank of Major until he was appointed officer-in-command of Moore Barracks Hospital in England. He was promoted to full colonelcy and was decorated C.M.G. for distinguished service. At the beginning of World War II, Dr. Scott organized the Medical Board of the Toronto District and was in charge of the work of examining recruits until the R.C.A.M.C. was able to take over the work. He took great interest in Free Masonry. He held high office in the University Lodge and in St. Paul's and St. Patrick's Royal Arch Chapters. He was a past president of the Military Institute, the Business Men's Division of the Canadian Legion ,and of the Æsculapian Club. Dr. Scott was a most capable surgeon and an enthusiastic and skilled teacher. He was held in high esteem by his colleagues and by the scores of interns who served under him. He was one of the most generous of men, but resented any mention of his numerous benefactions. In his later years he found a principal outlet for his humanitarian impulses in the Home for Incurable Children. His daily visits to the Home were eagerly expected by the unfortunates in that institution. He died childless and was predeceased by his wife eight years ago.

Dr. Daniel C. Sullivan, aged 55, died at Christ Church Hospital, Jersey City, on December 23. Born in Arnprior, Ont., Dr. Sullivan graduated from McGill University in 1919. He served as a lieutenant in the Royal Canadian Navy in the First World War. He is survived by his widow, a son, a sister and a brother.

Dr. Maurice Weiman died in Montreal on December 25. He was in his 41st year. Born in Newark, N.J., Dr. Weiman came to Montreal at an early age. He first studied dentistry at McGill University and later switched to medicine. He graduated from l'Université de Montreal. He is survived by two sisters and one brother.

Dr. Walter Henry Wright died in Toronto on January 14, in his 90th year. Born in Georgetown, he graduated in 1885 from Victoria College which conducted examinations for graduates in medicine until 1892. He practised in Tottenham for 35 years before coming to Toronto. He was a member of Fairlawn United Church. Surviving are two daughters, two sons and one sister.

NEWS ITEMS

Alberta

The Regional Meeting of the American College of Surgeons, is being held in the city of Edmonton on April 12 and 13. This meeting is open to all medical men who wish to attend. A good program is being arranged through the local Chapter of the College.

The Society of Obstetrics and Gynæcology of Canada is holding its Annual Meeting in Jasper, June 18 to 21. Dr. Ross Vant of Edmonton is the President of the Society.

Dr. Gordon Townsend of Calgary and Dr. Graham Huckell of Edmonton have returned from Chicago, where they attended the American Academy of Orthopædic Surgeons.

Dr. Brian O. Black of Lethbridge received his Certification from the Royal College of Physicians and Surgeons of Canada in the specialty of Diagnostic Radiology. This certification was granted following written and oral examinations and we wish to congratulate Dr. Black in this attainment.

Dr. Ardrey Downs of the University of Alberta has retired as Professor of Physiology and Dr. H. V. Rice, of Winnipeg has become Professor of the Department. Dr. Rice is a graduate of the University of Toronto and has been more recently associated with the General Hospital in Winnipeg in the capacity of electro-encephalographer and consultant neuro-physiologist.

Dr. Morley Young was elected President of the Council of the College of Physicians and Surgeons of Alberta at its annual meeting, this is the third consecutive year in which Dr. Young has held this important office.

The Calgary Medical Society held its annual Dinner and dance at the Palliser Hotel on February 8. The attendance was the best in many years.

W. C. WHITESIDE

British Columbia

Canada's first rehabilitation school for paraplegics was opened in Vancouver on Monday, January 17, by the Premier of the Province, the Honorable Byron Johnson. This new building of reinforced concrete construction, is situated near Shaughnessy Hospital and cost $200,000. It has been built mainly by privately contributed funds. The Kinsmen's Club presented the money to buy the site; the Women's Auxiliary provided some of the furnishings. The architect was Mr. Ross A. Lort, who designed the new buildings of the B.C. Cancer Institute. Mr. R. S. Plant is the president.

This school fills a great need in the Province. Prime mover in the long effort which has culminated in its building has been Dr. G. F. Strong of Vancouver, well known in the medical world of Canada. Speakers at the opening ceremonies joined in praise of his leadership and energy.

The new Hospital Insurance Plan of British Columbia is now in full operation. It is having its problems, among these of course being the terrible shortage of hospital beds, especially on the lower mainland, the tendency towards lengthening of hospital stay, the appearance in hospital of people who hitherto fought against going there, on account of the cost, and so on. The small but very voluble group who have led the protests against the new law, on account of its infringement of "personal liberty", and the compulsory elements of the scheme, is gradually dwindling, and the population as a whole is accepting it as, on the whole, a good thing. A few individuals have been caught without their tickets, and have had to pay full fees, which are now astronomical in their order of magnitude. Hospital rates have skyrocketed, in some at least of the hospitals, and have risen sharply in all, above the rates obtaining up to the end of 1948.

To facilitate accounting, and eliminate a great deal of complicated bookkeeping, a flat rate per person per day will be paid, regardless of the type of treatment given. Still subject to some adjustment are the auxiliary services, anæsthetics, x-ray, and the like.

A new agreement has been reached between the Government of British Columbia, represented by the Minister of Health and Welfare, Honorable Geo. S. Pearson, and the College of Physicians and Surgeons of the Province, in the matter of persons in receipt of government pensions—old age, mothers', the blind —or social assistance, relief, etc. There are about 40,000 people who come into these categories in the Province.

Under this new plan, accepted by all the municipalities and areas concerned, the Government will pay $14.50 annually per individual to the College, which agrees to set up a committee to administer the fund. Doctors treating these people will do so, in and out of hospital, as they do any other private patient of theirs, and will send their bills to the Central Fund, which will pay them *pro rata*, or in full, as the sums available will allow. The payment will be based on the minimum schedule of fees of the Province. This is a considerable advance on present methods, which vary extensively with locality, and have been largely subject to the decisions of local governmental authorities. From the point of view of the practising physician, the plan has several advantages. One, and not the least, is that it enables him to treat all his patients alike, instead of being limited in the case of pensioners, etc., to office and house calls. To judge from comments made by the patients who have been asked about it, the patients too will find the change a very welcome one.

The bad weather in British Columbia is affecting the supplies of blood to the blood banks of the Red Cross, and the supplies on hand are running dangerously low. Road conditions have been atrocious, and the mobile units which collect blood have been seriously hampered in their work.

J. H. MACDERMOT

Manitoba

The new $100,000 health centre adjoining the Dauphin General Hospital was opened on January 13 by Hon. Ivan Schultz, minister of health and welfare. The two-storey building will house the local health unit and district welfare offices, diagnostic services for the area, a lecture room and modern x-ray equipment. The building, 42 x 120 feet, is of reinforced concrete and stucco construction. It is connected by a tunnel with the General Hospital. Dr. Morley Elliott, director of extension services was present together with Hon. Robt. Hawkins, M.L.A. for Dauphin, and speaker of the House, and Mr. F. Zaptitny, M.P., Dauphin.

The annual dinner given to the interns of the Winnipeg General Hospital by the Board of Directors and the honorary attending staff was held in the MacDonald room, Fort Garry Hotel on January 15.

Dr. and Mrs. Irving Miller have returned to Winnipeg from London where Dr. Miller received the M.R.C.P.

In his report of the 1948 activities of Portage la Prairie health unit, Dr. Charles Manley, medical health officer, found that general conditions in rural schools left much to be desired. Malnutrition, eye conditions and dental defects were the most common defects found in the medical examination of 793 school children in the area.

Mrs. Bettina Carter, M.Sc., serologist at Western Pennsylvania Hospital of Pittsburgh, addressed a gathering of practitioners in the Nurses' Residence of the Children's Hospital, Winnipeg. She outlined her laboratory work which resulted in a method whereby hapten can be extracted from blood cells and injected into Rh negative mothers who possess antibodies. By the use of hapten erythroblastosis may be prevented. Mrs. Carter came to Winnipeg on the invitation of Dr. Bruce Chown, Professor of Pædiatrics.

Dr. R. E. Beamish, who obtained the degrees of M.R.C.P.(Edin.) and M.R.C.P.(Lond.) during his recent postgraduate work in Great Britain, has resumed the practice of medicine in Winnipeg.

Dr. A. Hollenberg, Winnipeg, is on a visit to New Zealand and will study the working out of health insurance in that Dominion.

The January meeting of the Winnipeg Medical Society was held in the Winnipeg General Hospital. The attending staff had arranged many and varied exhibits and demonstrations and showed interesting clinical cases.

Members of the Winnipeg Medical Society have donated well over $2,000 toward a Benevolent Fund for the relief of distress among medical practitioners and their families or dependents, and for the assistance of medical education. To date $625 has been expended.

ROSS MITCHELL

New Brunswick

Dr. J. K. Sullivan of Saint John attended the Urological (seminar) at Buffalo in January. This concentrated refresher was under the auspices of the American Urological Association and is reported as highly successful.

Dr. Thomas E. Nugent of Bath, who is the chairman in charge of the cancer diagnostic clinic at Perth, has completed a short postgraduate course at the Memorial Hospital for Cancer at New York. Dr. Nugent is the twelfth New Brunswick physician to receive a grant for study of cancer from the New Brunswick Cancer Society during the past year.

Dr. Arnold Farrell, radiologist at Lancaster D.V.A. Hospital successfully passed the examinations for certification in all branches of radiology as set by the Royal College of Physicians and Surgeons of Canada.

Lieut.-Col. R. B. Murray, chief medical officer Eastern Command recently spent seven days at H.Q. New Brunswick area at Fredericton. While in Fredericton Lieut.-Col. Murray conferred with Dr. J. A. Melanson, chief medical officer, Department of Health of New Brunswick on organization and recruiting of officers for the Reserve Force Army Medical Corps. This is a matter of very great importance to all medical officers, young and old, those with past services and to those who were too young to serve in past wars.

Dr. Melvin I. Acker of St. Stephen has begun practice in St. George. Dr. Acker is a recent graduate from Dalhousie Medical School.

Dr. E. A. Petrie of St. Joseph's Hospital, Saint John, presented a paper on the training of x-ray technical staff at the midwinter meeting of the Canadian Association of Radiologists at Halifax.

Three Fredericton physicians were elected to the Board of Trustees of the Victoria Public Hospital—Dr. H. S. Wright, Mayor of Fredericton, represents the municipality; Dr. G. E. Chalmers, represents the medical staff; and Dr. O. E. Morehouse, represents the physicians of the city and county.

Dr. Geo. White presided at the January meeting of the Saint John Medical Society. Business included some correspondence and discussion about the Red Cross Blood Donor Service. Dr. Ernest Ayre of Montreal had been announced as the speaker of the evening, but his recent illness prevented his appearance in Saint John. However his brother Dr. Bert Ayre, presented a splendid paper on "Cytology and Cancer Detection in General Practice", followed by the showing of a talkie film on cytological diagnosis which was so good that it made the method presented appear so simple as to deceive the unthinking onlooker. The large attendance at these monthly meetings continues and discussions were good.

On January 21 the St. Croix Medical Society and the Washington County, Maine, Medical Society held a joint Clinical Day in St. Stephen, N.B. Both societies held their monthly business sessions and also heard three visiting doctors present papers. Dr. Albert Ayre of Montreal, gave the paper on "Cytological Diagnosis in Cancer", already referred to. Dr. Geo. White, of Saint John, read a paper on "Posterior Positions", and Dr. Geo. F. Skinner, of Saint John, reviewed one year's work in "Chest Surgery at Saint John". A very large attendance was notable from both sides of the border.

Dr. J. R. Nugent was the special speaker at the annual meeting of the Saint John-Kings County unit of the New Brunswick Cancer Society. He reviewed the activities of the past year and found much to approve in the public educational program adopted by this unit.

A. S. KIRKLAND

Nova Scotia

The many friends of Dr. H. K. MacDonald, of Halifax, will be pleased to learn that he is making steady progress towards recovery and is now able to be about a little.

Dr. R. L. Aikens, graduate of Dalhousie University in 1939 and recently awarded a Fellowship in the Royal College of Physicians and Surgeons of Canada, has opened a practice in Halifax. He is a native of Stellarton, N.S.

Dr. L. M. Morton of Yarmouth is spending the winter in Florida. An enthusiastic golfer he reports the opportunities for play are unsurpassed. Members of the Medical Society are warned that Lou will be in extra fine form at the next annual meeting.

Maritime Medical Care, Incorporated is making steady progress in organization. Over 60% of physicians in active practice are reported to have signed contracts.

Dr. K. M. Grant and Mrs. Grant of Halifax, have returned from a trip to the Bahamas. Dr. Grant's health is greatly improved.

Dr. Hugh O'Reilly has established himself in practice in Freeport, Digby County.

H. L. SCAMMELL

Ontario

The Section on General Practice of the Ontario Medical Association announces the first in a series of postgraduate courses. Sunnybrook Hospital Auditorium, Toronto, will be the meeting place and the dates are March 28, 29, and 30, 1949.

The Committee an Arrangements, under the chairmanship of Dr. H. Gibson Hall, is providing an intensive course on Practical Surgery for this meeting, and plan to present, at future meetings, courses on Pædiatrics, General Medicine, and Obstetrics and Gynæcology.

Dr. Harvey Agnew has been elected a member of the American Association of Hospital Consultants.

Dr. C. R. Myers of the Department of Psychology, University of Toronto, attended the meetings of the planning board of the American Association on Mental Deficiency in New York on January 14 and 15.

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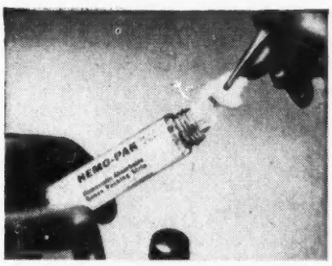

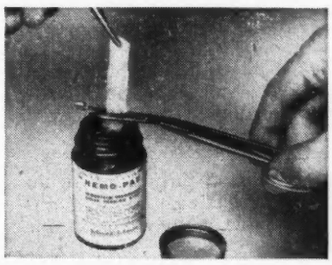

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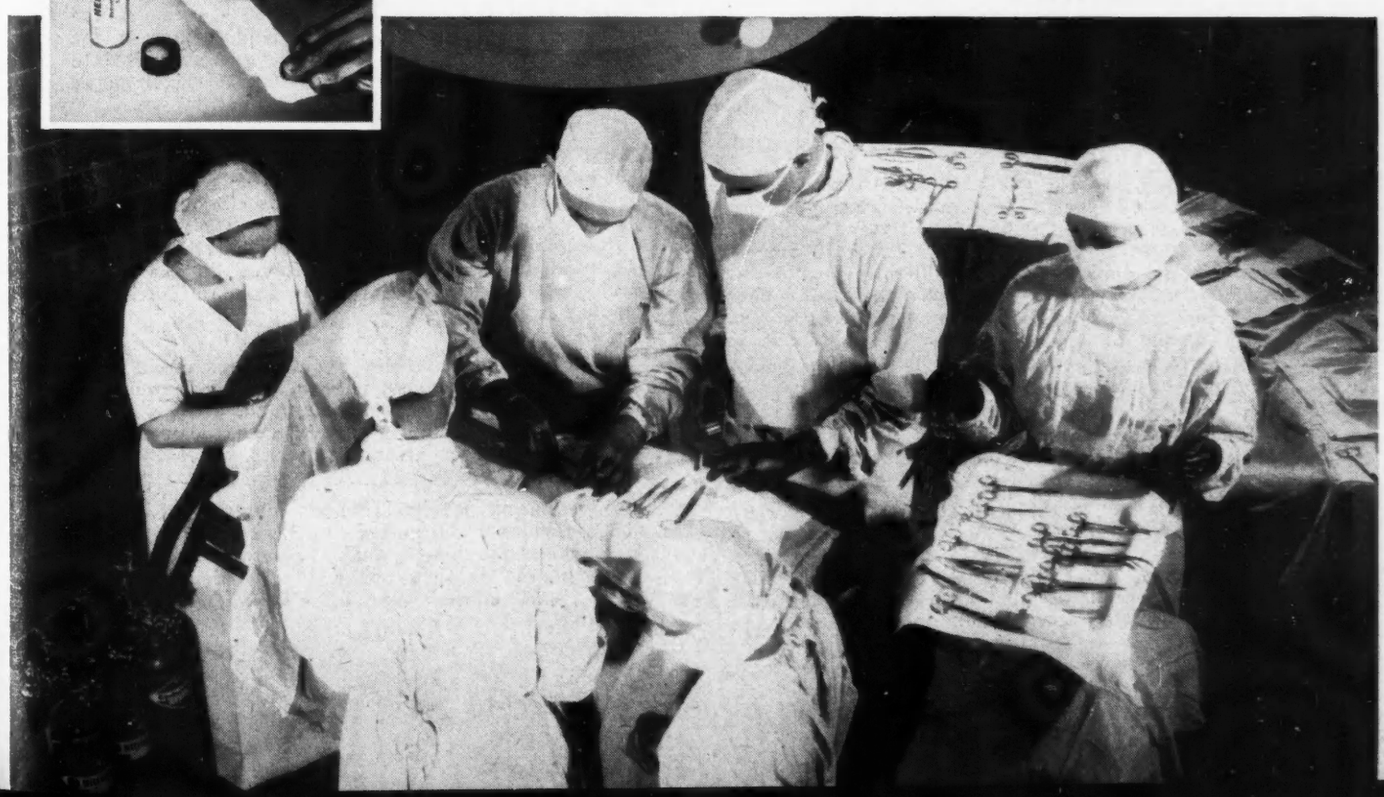

Dr. Andrew J. Rhodes, Research Associate at the Connaught Medical Research Laboratories and Associate Professor of Virus Infections at the School of Hygiene, has received a grant from the Federal Government for investigation of neurotropic viruses. Dr. Nelles Silverthorne of the Hospital for Sick Children is associated with him in studies of the method of spread of poliomyelitis. This work is supported by the Canadian Life Insurance Officers Association who are providing an annual grant of $15,000 for the joint study.

The University of Toronto, backed by a U.S. grant, is embarking on a research program to discover what's wrong with the diet of Canada's expectant mothers. Dr. Sidney Smith, University of Toronto President, said that the University is receiving $4,000 from the Robert Gould Research Foundation of Cincinnati to launch the project. It is the first Canadian Grant from this organization which has financed various nutrition investigations in the United States.

Administering the grant will be Dr. E. W. McHenry, professor of public health nutrition, who will work closely with Dr. H. B. Van Wyck, head of the department of obstetrics and gynæcology. "The two departments will co-operate in discovering troubles of childbirth which can be traced to diet deficiency and what should be done to avoid them," Dr. Smith said.

Dr. Edwin Seaborn of London, Ontario, has retired from 53 years of practice to devote his leisure to working on a new book. In 1916 he organized Number 10 Stationary Hospital which was stationed at Seaforth, Eastbourne and Calais. Its work is commemorated by a bronze tablet in the entrance hall of the University of Western Ontario Main Building. LILLIAN A. CHASE

The Noon Day Study Club of London have elected the following officers for 1949. Honorary President, Dr. E. Seaborn; President, Dr. J. W. Babb; First Vice-president, Dr. G. R. Collyer; Second Vice-president, Dr. H. H. Washburn; Secretary, Dr. Ellen Trout; Treasurer, Dr. W. S. Johnston. Luncheon meetings are held on Wednesday noons during the winter months.

A delegation from Ottawa, Mayor E. A. Bourgue and Controllers Daniel McCann and C. E. Pickering discussed with the Ontario Minister of Health, Russell T. Kelley, on January 12 the question of a chronic illness hospital for Ottawa.

Dr. W. Stuart Stanbury, National Director of the Canadian Red Cross Society, announced the inauguration on February 14 of a blood transfusion service for Ontario. A new clinic for blood collection will be opened on that day at 50 Bloor Street East, Toronto. Arrangements are being made throughout the Province for similar collections.

Christie Street Hospital, the home during the past thirty years of over 127,000 veterans, has closed. Last Post for it has sounded. A military hospital was opened there in February, 1918. Later it was taken over by the Department of Soldiers' Civil Re-establishment and in Great War II by the Department of Veterans' Affairs. It is now being replaced by Sunnybrook Hospital. Christie Street Hospital will probably become Toronto's Hospital for chronically ill aged people.

The Medico-Legal Society of Toronto has been formed to promote medico-legal and scientific knowledge. The Society will consist of qualified members of the legal and medical profession and others interested in this work.

Dr. Murray M. Cash, a graduate of University of Toronto has been awarded a Research Fellowship by the Mount Sinai Research Foundation, Chicago. Later he plans to return to Tulsa, Oklahoma and join the staff of Saint John's Hospital.

Dr. T. H. Orton has moved from Brooklyn to Pickering, Ont. Dr. R. F. McCallum has been appointed Coroner for Norfolk County. Dr. William Rice has moved from Brooklyn to Windsor. Dr. W. J. Hobson has opened a practice at Calabogie, Ont. Dr. J. K. Strathern has commenced practice in Orillia. Dr. Robert Robinson has been appointed Assistant in Bruce County Health Unit. Dr. W. W. Wilson has opened a practice in Aylmer, Ont. Dr. E. H. Lossing, who served several years in the Indian Medical Service, retiring at the time of self government in India, has commenced practice in Norwich, Ont.

NOBLE SHARPE

Quebec

On Thursday, February 1 a bronze plaque, in memory of the late Dr. Fraser B. Gurd, was unveiled at the Herbert Reddy Memorial Hospital. The invocation was given by the Ven. Archdeacon Gower-Rees, and short addresses were made by the Hon. Wilfrid Bovey, K.C., President of the Hospital, and by Dr. E. E. Robbins, Secretary. The plaque was unveiled by Dr. Charles C. Gurd of Montreal.

The eleventh annual meeting of the Quebec Division of the Canadian Medical Association will be held in Montreal, April 22 and 23, at the Mount Royal Hotel. The first day, Friday, will be taken up with registration, clinical sessions and visits to the commercial exhibits. Further clinical sessions will be held in the afternoon and the annual banquet will take place in the evening. On Saturday, clinical sessions will continue and, after lunch, a problem case report will be presented in the same form as last year.

La Division québecquoise de l'Association médicale canadienne tiendra à Montréal sa onzième réunion annuelle, à laquelle tous les médecins de la Province seront invités. Les séances auront lieu à l'hôtel Mont-Royal les 22 et 23 avril. Outre les réunions cliniques, il y aura une exposition pharmaceutique, un dîner annuel et un déjeuner de clôture.

The eleventh annual meeting of the Quebec Division of the Canadian Medical Association will be held in the Mount Royal Hotel, In Montreal, on Friday and Saturday, April 22-23, 1949. At that occasion the Quebec Division will be host to the physicians of the Province. Distinguished speakers have been invited to the Luncheon and to the Annual Banquet. Their names are to be announced later.

Conformément au programme fédéral de santé et selon la proposition du Ministère provincial de la Santé, Québec aura bientôt quatre nouvelles cliniques mobiles anti-tuberculeuses, qui seront rattachées aux hôpitaux suivants: le Sanatorium Cook (Trois-Rivières), le Sanatorium de Macamic (Abitibi), l'Hôpital du Sacré-Cœur (Cartierville) et le Sanatorium de Saint-Michel-de-Roberval.

La Société médicale des Trois-Rivières a élu à sa présidence le docteur Joseph Normand. Le conseil comprend en outre MM. Gérald Mayrand, vice-président; Jacques Cayer, second vice-président; Jean Dargis, secrétaire et Georges Racicot, trésorier.

L'Association des Médecins de langue française du Canada tiendra à Chicoutimi, du 2 au 4 juin prochain, son deuxième Congrès régional. Les assises scientifiques de ce congrès se tiendront à l'Hôtel-Dieu de Saint-Vallier, sous la présidence de M. Edmond Potvin, pédiatre-chef de cet hôpital.

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A NEW APPROACH TO THE TREATMENT OF ALCOHOLISM

Dear Doctor:

The Lancet of December 25, 1948, carried two important clinical reports on a relatively new treatment for alcoholism. These papers, "A Drug Sensitizing the Organism to Ethyl Alcohol" and "Treatment of Alcoholism with a Sensitizing Drug", both record the successful clinical work carried out with a new therapeutic agent, "Antabuse".

A few months ago, when "Antabuse" first came to our attention through reports in European medical journals, one of our technical staff flew to Denmark to investigate its possibilities. So impressed were we by the extensive pharmacologic studies and the results obtained through its clinical application, that we immediately made arrangements to manufacture the drug (under license from Medicinalco Denmark) for distribution to the medical field in both Canada and the United States.

Although non-toxic in proper dosage forms, this drug can provoke dangerously unpleasant side effects when improperly used. For this reason it is anticipated that "Antabuse" will be placed on the prescription list by regulation of the Department of National Health and Welfare.

It should be emphasized that "Antabuse" is not in itself a cure for alcoholism. It has been shown, however, to be an invaluable adjunct to present psychotherapeutic measures. Clinics have already been set up in several of the leading psychiatric institutions in Canada where intensive study is being conducted on the therapeutic application of "Antabuse".

"Antabuse" will be available on prescription through your retail pharmacy. Should you be interested in any data immediately, Dr. J. Jewell of our Medical Department will be glad to be of service.

Sincerely yours,

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William A. Leslie

President.

638

Le docteur Rolland Blais a été nommé pour deux ans à la présidence du Bureau médical de l'Hôtel-Dieu de Montréal. MM. Paul Letendre et Jean Charbonneau feront également partie du conseil.

Au début de février, s'est formé à Montréal un Comité de la Réhabilitation, sous la présidence conjointe de MM. Fred. Smith et Edmond Dubé, doyens des deux Facultés montréalaises. Ce comité aura la tâche d'unifier l'activité d'un certain nombre d'organismes privés et publics s'occupant de la réhabilitation des personnes handicappées par la maladie.

PAUL DE BELLEFEUILLE

Saskatchewan

At the recent meeting of the Council of the College of Physicians and Surgeons of Saskatchewan, Dr. J. J. Hamelin, North Battleford, was elected President; Dr. E. A. McCusker of Regina, First Vice-president, and Dr. J. A. Matheson of Gull Lake, Second Vice-president. Two new members were welcomed to the Council in the persons of Dr. H. Gordon Young, Moose Jaw, and Dr. J. E. McGillivray, Weyburn. Dr. Young replaces Dr. F. C. Heal, and Dr. McGillivray, Dr. M. H. McDonald. Senior Life Membership was conferred upon Dr. J. C. S. Brown of Saskatoon for having completed forty years of active practice in the Province.

The Council approved the negotiations applying the contract schedule of fees to the Workmen's Compensation Board.

Members of the College met with the Honourable T. C. Douglas and the Health Services Planning Commission to place before them certain recommendations on how best to conduct the health survey and to expend the Dominion health grants. As a result, a committee has been established by Order-in-Council composed of two representatives of the Health Services Planning Commission in the person of their chairman and secretary, two representatives of the College of Physicians and Surgeons, one from the Saskatchewan Hospital Association, one from the College of Dental Surgeons, one from the Saskatchewan Registered Nurses' Association, together with five non-professional members from the public at large. It is expected that this committee will be in a position to actively study and guide health in this Province.

The annual meeting of the College of Physicians and Surgeons will be held on September 15, 16, 17, at Regina. Convention headquarters will be the Hotel Saskatchewan and plans are already going forward to make it a busy meeting.

The Saskatchewan Division welcomed a visit from Dr. A. D. Kelly and the opportunity of furthering plans for the Canadian Medical Association in Saskatoon. Dr. Kelly was also instructed on the progress being made in this Division concerning health grants and visited the government office in Regina.

G. G. FERGUSON

General

The American Board of Ophthalmology wishes to announce that it does not evaluate, approve, or disapprove any ophthalmic residency toward fulfilling the requirements for candidates for board examinations. Any candidate who qualifies for the board examination and completes the pre-requisites as outlined in the booklet of information will be accepted. A copy of this booklet can be obtained from the Secretary of the American Board of Ophthalmology, 56 Ivie Road, Cape Cottage, Maine.

More than 1,000 physicians interested in allergy from North America and abroad are expected at the Palmer House from 2 p.m. Thursday, April 14, to 5.30 p.m. Sunday, April 17. Everyone who comes is urged to bring his wife and any office personnel interested in the various phases of allergy. Both members and non-members are urged to attend and are required to register and receive a badge. There will be no charge for registration. There will be over 20 scientific exhibits and 40 technical exhibits of interest to allergists.

All those attending the annual meeting are requested to make their own hotel reservations directly with the Palmer House. A block of rooms has been reserved for those attending the meeting. Please direct all correspondence to the Reservation Manager, Palmer House, Chicago 90, Illinois and include your arrival and departure time, and the type and rate of room desired. Be sure to indicate that you are attending the meeting of the American College of Allergists.

International Congress on Rheumatic Diseases. — More than 150 physicians from foreign countries are expected at the International Congress on Rheumatic Diseases to be held at the Waldorf Astoria in New York City from May 30 to June 3, 1949. Many of these physicians will present papers before the plenary sessions which will be held in the mornings. In the afternoons clinics will be held at several of the New York hospitals. The official languages of the Congress will be English, French, and Spanish, but instantaneous translations of the scientific papers given at the plenary sessions will be made by means of the I.B.M. wireless system. The meeting is open, and the registration fee is $10.00.

BOOK REVIEWS

Skeletal Tuberculosis. V. Sanchis-Olmos, Assistant Director of the Instituto Nacional de Reeducacion de Invalidos de Carbabanchel Bajo (Madrid, Spain). Translated from the Spanish by J. G. Kuhns, Chief of the Orthopædic and Surgical Services, Robert Brigham Hospital. 274 pp., illust. $5.00. The Williams & Wilkins Co., Baltimore, 1948.

This book will be of great interest to those interested in the subject of bone and joint tuberculosis, because it presents the concepts of the Spanish School, and these are little known in North America. The first half of the book is a general discussion. Under pathogenesis the author combines the concepts of Ranke and Redeker with his own, to arrange tuberculosis into four periods. There is the period of primary invasion of a viscus, followed by the secondary period of blood stream dissemination when there is general hypersensitivity of the body to tuberculosis. There follows an intermediary period when general allergy subsides, leaving only the local bone lesion active, and this is followed by the tertiary period of local chronicity with tendency to heal by scar formation. However, the equilibrium of the third stage may at any time be upset by a variety of factors, resulting in a relapse to stage two, with recurrence of general allergy and the appearance of new foci. The site of new foci may be due to local trauma or biological changes (Auer's concept).

Under pathology, he fits bone and joint lesions into a classification similar to that used for pulmonary lesions because osseous lesions have their pulmonary counterparts. *i.e.*, exudative, productive (or granulomatous) and caseous (or necrotic). He argues convincingly for the occurrence of exudative reactions in bone and in synovia, as well as for the recognized granular and caseous reactions, and explains the occasional formation of early, large "hot" abscesses on this basis. There is a tendency for the x-ray appearance of each type of lesion to be characteristic, but lack of serial x-rays and the frequent occurrence of mixed forms, may make recognition difficult.

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A UNIQUE METHOD of sharpening and bevelling, plus rigid inspection, assure unvarying uniformity of B-D needle points . . . an exclusive process of joining hub and cannula provides needles of consistently true bore, from point to hub . . . with every hub micrometer-gauged to insure perfect fit.

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BASIC DESIGN of B-D Needle point provides extra lateral cutting edges to insure relatively painless penetration. Solid, sturdy construction minimizes "fish-hooks", while the velvet-smooth finish of the cannula contributes further to the utmost in patient comfort.

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The second part of the book is devoted to a detailed discussion of the diagnosis and treatment of tuberculosis in each of the bones and joints of the body. The clinical observations are the author's own, made in Spain and in the United States, but the opinions of numerous outstanding specialists are discussed, and there is an excellent bibliography, arranged alphabetically. An attempt to understand and apply the concepts put forth in a book like this is very stimulating.

Textbook of Mental Deficiency. A. F. Tredgold, Consulting Physician to University College Hospital, London. 550 pp., illust., 7th ed. $7.50. Baillière, Tindall & Cox, London; Macmillan Co. of Canada, Toronto, 1947.

This book, a standard for forty years, is based particularly on the British experience. It methodically treats of the innumerable grades of submental people from the helpless and hopeless low-grade idiots to the borderline individuals that pass into that considerable substratum of the "normal" general population whose units are slow and stupid but often useful. Its most ominous feature is the demonstration that mental deficiency is rapidly increasing, which means that the mental efficiency level of the population is fast going down. Apparently this is because modern civilization makes things too easy for the mental deficients, who are maintained at the expense of society whereas in more primitive eras they were automatically eliminated. The low mental efficients are often prolific, while the high, as a class, reproduce but poorly. Ordinary democratic societies seem to be able to do little or nothing to inhibit, much less reduce, this ugly accretion of the unfit. Hence the prospect is gloomy with the mental deficients piling up on the shoulders of the weakening group of efficients to such a degree as to suggest an ultimate calamity as stupendous, though not as dramatic, as the widespread use of the atom bomb. Sterilization and euthanasia, though guardedly endorsed by Tredgold, have never been adopted as remedies in a businesslike way.

So well known is this authoritative and thorough treatise that no analysis is needed here. The substantial amount of new information gained in the last ten years has been included in this new edition, which has been completely revised and largely re-written. Altered points of view, such as those arising from the adoption of the Education Act of 1944, relating to educationally subnormal and defective children, have found a place. It should be read not only by all members of the medical profession, and in particular those who have to deal with the diagnosis, administrative disposal and treatment of defectives, but by everyone interested in the subject from the social and public health points of view. The reviewer would recommend it particularly to legislators, clergymen, judges, lawyers, teachers and social workers. It should be a "must" in university medical and sociological courses.

Tuberculosis. F. M. Pottenger, Emeritus Professor of Medicine, University of Southern California, The School of Medicine. 597 pp., illust. $13.50. The C. V. Mosby Co., St. Louis, Mo.; McAinsh & Co., Ltd., Toronto, 1948.

This book constitutes an attempt to set forth the author's views regarding tuberculosis as the result of study and close observation of hundreds of patients over a period of many years. The first nine chapters have to do, in the main, with the pathogenesis of tuberculosis of the respiratory system. The tenth and eleventh chapters have to do with the visceral neurology of pulmonary tuberculosis, a subject on which the author did some pioneer work years ago and in which he still is very much interested. The following fourteen chapters contain detailed accounts of the parts which histories, physical examinations, x-ray findings and laboratory findings play in the diagnosis of pulmonary tuberculosis, and, in addition, a few notes regarding certain complications of this condition. The remainder of the book, with the exception of the final chapter in which future programs for the control of tuberculosis are discussed, has to do with the treatment of the pulmonary form of this disease. The views set forth in this section of the book clearly indicate that the author considers general body rest—both physical and mental; good food; and, at the appropriate time, graduated exercise, factors of paramount importance in the arrest of pulmonary tuberculosis.

Pathological Histology. R. F. Ogilvie, Lecturer in Pathology and Assistant in Forensic Medicine, University of Edinburgh. 459 pp., illust., 3rd ed. $9.25. E. & S. Livingstone, Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1947.

This edition has been completely revised and modernized. As a companion to a good standard textbook of pathology it has no equal. Following the traditions of the Edinburgh medical school where the teaching of morbid anatomy was made famous by the late Lorrain Smith, this book features 260 magnificent illustrations in very fine full colour reproduced from Finlay transparencies. Each photomicrograph shows the staining reactions quite clearly and is accompanied by a clear and precise description of the morbid process. As Professor Drennan indicates in his Foreword, "No book on morbid histology can ever replace study of the actual specimen, but a book may so vividly represent and interpret the original that its study is greatly facilitated and revision of knowledge simplified. Dr. Ogilvie has succeeded in presenting such a volume." It is especially recommended for graduate students.

Diseases of the Chest. R. Coope, Consulting Physician, King Edward VII Sanatorium, Midhurst. 541 pp., illust., 2nd ed. $6.25. E. & S. Livingstone, Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1948.

The second edition of this treatise on respiratory disease following two reprintings since it was first published in 1944 is a good attestation of its excellent qualities. The scope of the first edition is not extended very much but certain errors have been corrected. Emphasis is placed on the diagnosis of chest diseases from the history and physical signs. The latter are clearly explained and illustrated by excellent diagrammatic drawings. The book is encyclopædic in scope, extremely well written and very easy to read. Students could find no better book in this field and teachers could well profit by the methods with which the principles and treatment of respiratory diseases are handled by Dr. Cooke. It could indeed be used as a model for writing medical books. The whole subject is well conceived, beautifully presented and thoroughly indexed.

Understandable Psychiatry. Leland E. Hinsie, Professor of Psychiatry, College of Physicians and Surgeons, Columbia University. 359 pp. $4.50. Macmillan Co., New York and Toronto, 1948.

The purpose of this book is to make psychiatry understandable to physicians and patients. It contains much of value to the physician and to the patient, although the latter may find disturbing information, open to misinterpretation. The descriptions of symptoms and signs occurring in the various mental disorders, are vivid and accurate. The psychopathology assigned to the symptoms is analytically determined. Physicians without training in psychoanalysis may find difficulty in accepting some of the explanations offered in this book. The author recommends deep psychotherapy in conjunction with the usual treatment aids, *e.g.*, occupational therapy, for the prevention and treatment of certain mental conditions. Electro-shock therapy might have been discussed more fully, in view of its widespread use. This is a readable, stimulating book which merits thoughtful consideration by physicians interested in psychiatry.

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Internal Medicine in General Practice. R. P. McCombs, Professor of Medicine and Director of Postgraduate Teaching, Tufts College Medical School. 741 pp., illust., 2nd ed. $9.00. W. B. Saunders Company, Philadelphia and London; McAinsh & Co., Ltd., Toronto, 1947.

This is a concise review of Internal Medicine and should be a very useful book as a "refresher course" for any general practitioner. It is well written and easy to read. The methods of examination described are clearly presented. The author apparently has had a great deal of clinical experience and his clinical suggestions are valuable. He does not introduce too many of the controversial questions of medicine but contents himself with the more widely accepted methods of treatment in the sections dealing with therapy. The general arrangement of the book makes it easy to use as a reference.

Manual of Practical Obstetrics. O. Browne, Master, Rotunda Hospital, Dublin. 267 pp., illust., 2nd ed. $8.75. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada Ltd., Toronto, 1948.

This is an excellent practical manual of Obstetrics for students and general practitioners. The sections on the infant and blood groups contained in the first edition have been omitted. As the author states "Additional text has been added to meet the greater attention which is being devoted yearly to antenatal care and diet: a short account is given of erythroblastosis fetalis and allied disorders: reference is made to the more recent classification of pelvic types and deformities, and the entire section on the concepts of puerperal fever has been brought up to date. Alterations have also been made in the treatment of breech delivery; and wherever necessary throughout the text."

Surgical Treatment of the Abdomen. Edited by F. W. Bancroft, Formerly Associate Clinical Professor of Surgery, Columbia University; and P. A. Wade, Associate Professor of Clinical Surgery, Cornell University Medical College. 1044 pp., illust. $20.00. J. B. Lippincott Co., Philadelphia, London and Montreal, 1947.

This book completes the series edited by Bancroft, the previous ones being "Surgical Treatment of the Soft Tissues" and "Surgical Treatment of the Nervous System". Thirty-six eminent contributors have been chosen to cover the various topics in this work. The book is presented in four sections: (1) Anæsthesia, (2) General Principles, (3) Surgery of Mouth and Œsophagus, (4) Surgery of the Abdomen. Emphasis has been placed on presenting generally accepted techniques, with reference to pre-operation preparation, anæsthesia and postoperative care, as well as diagnoses and treatment. It is profusely illustrated by diagrams, drawings and photographs. Each chapter carries an adequate and up-to-date bibliography and the book should prove a useful reference for postgraduate students and surgeons.

Essentials of Dermatology. Norman Tobias, Assistant Professor of Dermatology, St. Louis University. 518 pp., illust., 3rd ed. $6.75. J. B. Lippincott Co., Montreal, 1948.

The author has well maintained the standard he has set in the previous two editions of this book. In the present edition the rarer dermatoses have been omitted while special revision has been made of the chapters on occupational dermatitis, syphilis and ringworm of the scalp. Many new paragraphs have been added and old ones replaced with better ones. This book was designed to provide a brief treatise, an introduction, to the principles of diagnosis and treatment of disease of the skin for the elementary student, yet adequate for the needs of the busy practitioner. The author has well succeeded. The reviewer has no hesitation in recommending it for that purpose.

Thyroid and its Diseases. J. H. Means, Jackson Professor of Clinical Medicine, Harvard University. 571 pp., illust., 2nd ed. $14.00. J. B. Lippincott Co., Philadelphia, London and Montreal, 1948.

This is the second edition of Dr. Means' well-known book on the thyroid and its diseases. It contains chapters on the pathology and on tumours of the thyroid by Dr. R. W. Rawson, physician to the Massachusetts General Hospital and on Surgery of the Thyroid by Dr. Cope, visiting surgeon to the same hospital. The volume probably contains or makes reference to every bit of information on diseases of the gland which has appeared in medical literature. There are approximately 1,000 references. One valuable inclusion in so detailed a study is a summary at the end of each chapter. This enables the reader who is not an advanced student of the subject to grasp the facts without wading through detail. The book is a splendid example of the amount of knowledge of a subject which can be accumulated by years of accurate observations in the hands of enthusiastic and able investigators.

Neuroanatomy. F. A. Mettler, Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, New York. 536 pp., illust., 2nd ed. $11.00. The C. V. Mosby Co., St. Louis; McAinsh & Co., Ltd., Toronto, 1948.

The first edition of this book by the Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, appeared in 1942. The present edition keeps the same general arrangement of material, but adds many new facts in this rapidly expanding field of knowledge and research. In the section dealing with the cerebellum are a series of coloured diagrams which summarize the recent work of Jansen and Brodal. These are not yet available in any other English text. As may be judged, this is not a book for the undergraduate in medicine but rather a text of reference for the specialist. The book is highly recommended for this purpose. There is a large and useful bibliography at the end of the text.

Treatment by Manipulation. A. G. Timbrell Fisher, Commander of the Order of St. John of Jerusalem, Fellow of the International College of Surgeons. 275 pp., illust., 5th ed. 25s. H. K. Lewis & Co. Ltd., London, 1948.

This edition of the well known work on joint manipulation has been rewritten in the light of the recent advances in diagnosis of joint pain. The author has included some discussions of the intervertebral disc in the etiology of low back pain. It is hoped that in some future edition more definite pathological details will be possible as there is still considerable difficulty in determining beforehand when manipulation will be of value. The increased number of illustrations are valuable as they show the details of the manipulations described. With their help, any reader of the book should have no difficulty in undertaking any manipulation. This is still the outstanding work in its field and should be in the possession of all practitioners who have to deal with damaged and diseased joints.

Handbook for Dissectors. J. C. B. Grant, Professor and Director of the Department of Anatomy, University of Toronto; and H. A. Cates, Professor of Anatomy, University of Toronto. 414 pp., illust., 3rd ed. The Williams & Wilkins Co., Baltimore, 1948.

In the third edition of this well established dissector's handbook, the authors have attempted to revise the text so as to clarify instructions which were found by experience to need amplification. As stated in the preface, this is not a textbook. It should be noted that, although theoretically, this book stands by itself, it will be found most satisfactory where the accompanying course textbook is Grant's illuminating Method of Anatomy.